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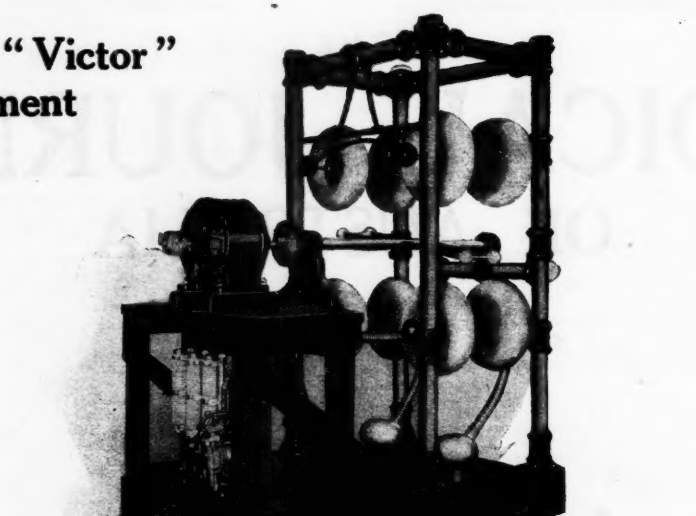

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THE MEASUREMENT OF INTELLIGENCE OF SCHOOL CHILDREN.[1]

BY GILBERT E. PHILLIPS, M.A., D.Sc.,
Teachers' College, University of Sydney.

In choosing a subject for this evening's paper I found my thoughts oscillating between two different topics. The first was the theoretical foundation for the practical measurement of intelligence and the other the practical application of the theory to the measurement of the intelligence particularly of school children. I chose the latter because of its wider interest and its comparative ease of presentation. Either would consume the time which your Secretary has so kindly placed at my disposal. Yet it must not be forgotten that theory must precede practice and that practice without theory would be blind. Consequently I will ask you to assume, without any attempt at proof at my hands, first that there is something which we call intelligence, that it is not a mere assumption which psychologists have made to provide a basis for their practical work and, secondly, that intelligence is a measurable quantity, *id est*, it exhibits differences in human beings and that these differences are measurable.

[1] Read at a meeting of the New South Wales Branch of the British Medical Association on April 13, 1923.

Definition of Intelligence.

In common speech, I fear, the term intelligence has many meanings, with a consequent confusion of thought. Two theories are in the field at the present time. Both have many followers. The followers of one theory, whose sponsor is Thorndike, regard intelligence as the sum total of all our mental abilities and probably most laymen, if they were asked to define intelligence, would agree with this view. Intelligence is the sum of a large number of discrete abilities and therefore its estimation would necessitate a large number of measurements, theoretically an infinite number. The individual would have to be viewed and measured as it were from every angle. It is important to notice, if this is so, that intelligence has no objective existence. It is then a name for a mere aggregate of abilities. The other theory, whose author is Spearman, is usually known as the "theory of two factors." Spearman holds that intelligence is determined by two mental factors. The first of these, general ability, is a common factor entering into every task we do and more or less determining our performance at that task. The second factor comprises specific abilities. One of these is called into activity in every task and, combined with general ability, determines our performance. The general factor is constant for all tasks in the same individual, while

the specific factors vary in quantity for each task. Performance, whether it be of child or adult, depends upon the two in combination. Spearman regards the general factor or general ability as the general fund of mental energy possessed by the cerebral cortex. Berry, of Melbourne, seems to be in agreement with him on this point, although he approaches the problem from the neurological standpoint. To give a material conception to Spearman's specific factors would necessitate a great deal more localization of function than has yet been discovered in the cortex. But it is his factor of general ability which I personally interpret as general intelligence. As far as I know, neurological theory does not conflict with it, but rather adds support. From the psychologist's standpoint this theory is in my opinion the only one that explains all the experimental data at his disposal.

Methods of Measurement.

It has sometimes been asserted that intelligence can be measured indirectly by taking certain physical measurements, usually cranial. But so far the results obtained do not substantiate this assertion. In connexion with this problem, the best set of measurements of Australian children, is that collected by Professor Berry on the correlation between volume of the brain and intelligence. But Professor Berry is careful to point out that, while such measurements will give an indication of the degree of intelligence of a group, they are extremely precarious if they refer only to individuals. Most will agree, other things being equal, that the brain volume is a good measure of intelligence, but the only way to get these "other things" equal is to measure a large group. It hardly needs pointing out that, if we possessed a physical trait which was a perfect index of intelligence, the measurement of the latter would be much more accurate than if we relied on the measurement of some mental trait, for we know that the margin of error in mental measurement is much larger than that of even a coarse physical measurement. However, for the present at any rate we must depend on psychological methods rather than on physical ones for the measurement of intelligence.

The first pre-requisite of measurement is a standard. For measurement of length we need a foot, for temperature a degree, but what shall we use as a standard of intelligence? This brings us to one of the psychologist's main difficulties. It is evident that there is no natural ready-made instrument, unless we depend on the subjective estimate of certain men, as is sometimes done. But subjective estimates are unscientific because of their extreme fallibility and variability. The psychologist has to resort to the same practice as the physician. You judge the temperature of a patient with regard to the normal temperature, *id est*, the mean temperature of a large number of presumably normal people. In the same way we proceed to measure a large number of presumably normal individuals and the mean of our measurements constitutes the standard. But, whereas in the case of children there is no need to have a standard temperature for every age of life, the physician still must have some progressive standards, *exempli gratia*, height and weight, because both of these develope during childhood. The psychologist proceeds in an exactly similar fashion, by measuring large numbers of children of all ages. The mean for each age constitutes the standard. This takes considerable time. We have been now over four years on the task of standardizing an individual intelligence test like the Binet test and have examined considerably over two thousand children, using only specially trained observers and taking an average of nearly an hour over each child. It is slow work.

Having obtained standards, the work of measuring intelligence offers no great difficulties, but in the absence of such standards no scientific measurement is possible. All work so far done in Australia in measuring intelligence is purely tentative. As far as I know there are no published Australian standards except the work done in Melbourne by Porteus on maze tests. We have not found these so satisfactory here as a measure of general intelligence as Porteus did in Melbourne. Given the standard, each child is ranged against it and its intelligence estimated, usually as a ratio. Supposing a child of ten years can only perform as well as the standard child of eight years, then he is said to be aged eight years mentally, or—and this is more important—his intelligence quotient is 80. Similarly, a child of eight years who mental age is 6.4 years, has an intelligence quotient of 80. The normal child, of course, has an intelligence quotient of 100. An intelligence quotient over 100 is supernormal. The surprising characteristic of this intelligence quotient is its constancy throughout the developing period of life. The child who has an intelligence quotient of 100 at six years of age, will show approximately the same intelligence quotient if he be again examined at twelve years of age. Of course, there are discrepancies, as both measurements will depart from the absolute true measure. Terman gives an interesting account of the re-examination of four hundred and thirty-five children after intervals ranging from one day to seven years; in three hundred and forty-nine instances the interval was longer than a year. Of these, three hundred and nine showed a difference in intelligence quotient in the two testings of not more than seven units, while one hundred and twenty-six showed differences of more than seven units. This is a striking instance of the constancy of the intelligence quotient, especially when consideration is given to the various factors entering into the examination which make for accuracy. The health of the subject, the variations in interest, the effects of fatigue and the number of different examiners, thirty-three in all, will all add their quota of inaccuracy. The probable error of an intelligence examination such as Terman's adaptation of the Binet scale is about 4.5 units in the intelligence quotient. That is to say, if a child's intelligence quotient is 100, the probability is that his true measure is somewhere between 95.5 and 104.5. This constancy and accuracy of an intelligence rating by individual tests of the nature of the Binet scale is amply borne out by the data that we have collected in Sydney, although as yet the

numbers are too small to allow us to draw any general inference.

Results of Measurement.

I would like now to refer to one or two results that have been obtained by the application of the testing of intelligence with tests of the Binet type. One great fact is the startling differences in intelligence between children of the same chronological age and the corresponding differences in the rate of development of intelligence as shown in the intelligence quotient. Even school children show remarkable differences in this quality and they are, after all, a somewhat select body, select in the sense that the mental and physical weaklings are not represented in their true numbers, because the most inefficient tail end of the whole body has been weeded out. In the one school we have found that children of ten years chronological age, varied in mental age between five and a half years and fourteen and a half and we have found intelligence quotients ranging from 53 to 146. We have become most keenly aware of this great disparity in native ability, whereas before, although we had a vague idea of such differences among school children, no one, I think, would have dared to assert that the extremes were so wide apart.

Further, in the same class where we get, of course, considerable differences in chronological age, we also get much greater differences in the mental age and yet still greater extremes of intelligence quotient. Now the class is theoretically an homogeneous unit composed of children for whom a certain mental diet is prescribed to be absorbed at a given rate. Practically the class is far from homogeneous in intelligence, although its members may all be at the same standard in scholastic attainments. We have found in Sydney schools mental ages between the two extremes of eight years and thirteen years in the same class and, what is much worse from the teachers' point of view, the intelligence quotient of these two children were respectively 138 and 72. As the intelligence quotient expresses rate of mental development, how could any teacher possibly be expected to make these two children progress scholastically at the same rate? The trouble is that teachers have been concerned merely with attainment, oblivious of the fact that for class teaching purposes the criteria for classification must be the attainment and the rate at which the child develops. Two or three important results follow from this maladjustment. On the teacher there falls the strain of trying to force all the members of his class to progress at the same rate. He prods the slow and hauls back the quick and undergoes a strain which, I suspect, is one of the causes of the undue prevalence of nervous breakdown among members of the teaching profession. The effects on his pupils can be divided into two groups. The urging on of the pupils with low intelligence quotients is too often done by means of punishment and this leads to a hatred for school and schooling. This in its time leads to truanting and delinquency then is not far off. The children's court officials can give plenty of information regarding the connexion between low intelligence quotient and delinquency. In order to break this iniquitous chain of school stress, truanting and delinquency the Education Department has instituted a school for truants at Guildford, to prevent these children lapsing into the third stage of delinquency. I examined the mental condition and interrogated all the pupils at this school for, I think, the first two years of its existence. In almost every case, although with one exception the boys could not be classed as mental defectives, the intelligence quotient was below normal and this with American standards which we now know to be too low for Australian children. Further, on being questioned about the cause of their truanting, these boys nearly all admitted that they disliked school and the reason that most gave was that the teacher caned them for not being able to do their work. From these considerations I was forced to the conclusion that the ultimate cause of much delinquency and finally of crime is the faulty system of classification in public schools. For it is the person with the low intelligence quotient who is mainly responsible for the prevalence of crime and we are attempting to solve the problem from the wrong end. Gaols will never cure the evil. What is needed is a system of crime prevention by a careful study and a reasonable and appropriate education of the mentally sub-normal, just as you in medicine devote considerable research and study to the prevention of disease.

The second disastrous effect on pupils by neglecting the intelligence quotient measurement is perhaps worse than the former, but is hardly so easily appraised. The brilliant boy who is held back in order to keep the scholastic line straight, is, I believe, a greater sufferer. The progress of this next generation depends upon the development of the most acute minds in our schools to-day. The children with intelligence quotients, say, above 130 are the leaders of the coming generation. The 100 intelligence quotient child can learn and utilize what has been discovered and invented for him, but he will not originate. A civilization's progress depends not upon the normal members of the community, but upon the super-normal who can do and will do the discovering and inventing. These are the children who are being sacrificed by our present ideas of class teaching. The most retarded children scholastically are almost universally the brightest. They are kept in classes below that which their ability proclaims their status should be, they conceive a contempt for learning because it comes easily and they are provided with a false standard of self-valuation by being forced to compete with their intellectual inferiors. Mental indolence and apathy are the result of not being provided with an educational environment which would force them to use their brains, as we say, and develope habits of thought and criticism. I regard the super-normal child as of supreme importance and for him would willingly sacrifice the sub-normal, if that sacrifice were necessary. We read reams about the education of the mentally defective child and squander oceans of sympathy over him and here I believe we are backing the wrong horse. Nationally the former child will pay handsome dividends upon any money invested on his behalf, while the latter, although an

urgent social problem, yet must take second place in importance. As far as education is concerned the super-normal child is of paramount importance, while as a social or medical problem one cannot neglect the sub-normal.

A second interesting result obtained from the application of tests of intelligence is the knowledge of the relatively short period of its development. Most of us would regard the average man of twenty-one years of age as being distinctly superior to the boy of sixteen years in intelligence, yet, if we regard intelligence as native endowment, it is very difficult to disclose any apparent increase after about fifteen years. Of course, there is no question that the adult is wiser than the fifteen-year-old lad, but the increased wisdom is rather a matter of the increased knowledge that comes with age. Our ability to excel in the world depends first upon our knowledge, which itself depends on several factors, intelligence being one, memory another and opportunity a third, and, secondly, upon our intelligence or innate power we have of using our knowledge. The former is continually accumulating, but the latter reaches its maximum development very early in our existence. That is why we believe that the differences in capacity between the average lad halfway through his teens and the adult are mainly due to differences in amount of accumulated knowledge, not to differences in intelligence.

In measuring intelligence there is no possible way of eliminating the effects of the subjects' differences in degree of knowledge. Good intelligence tests either assume a minimum of knowledge or else provide the requisite data and measure the subject by the use he can make of it, as, for example, a reasoning test.

The evidence for the comparatively short duration of the development of native intelligence all points in the one direction, although concerning the upper age limit there is a certain amount of disagreement. In formulating his intelligence scale, Binet did not extend his questions beyond the age of fifteen. After this he gives five tests for adults which have since been found to be too difficult for the average adult. Terman could find no differences in the intelligence of school children after the age of fourteen years and in calculating the intelligence quotient he assumes that the intelligence attains its maximum degree of development at sixteen years. Burt does not carry his reasoning scale beyond fourteen years. Ballard, for the purpose of settling this vexed point, examined about two thousand subjects from primary schools, secondary schools, evening adult continuation schools and institutions for the training of teachers. The tests used were those for the appreciation of absurdities, a proved good measure of intelligence. He found that there was no appreciable increase in the scores after the age of sixteen years. The adults at teachers' training colleges did no better than children of sixteen in the secondary schools and the adults at evening continuation schools did much worse than either. Ballard concludes that the upper age limit of the development of intelligence is at latest sixteen. If this is true it can be interpreted in two ways. Either everyone continues his intellectual development up to the age of sixteen years and then stops, or else sixteen years is the latest age up to which even the best of us may continue to develope. In this case some may cease to develope at a much earlier age. The latter seems to me to be the more feasible interpretation, especially in the light of the records of intelligence examination in the American army which showed the average mental age of recruits during the Great War to be between thirteen and fourteen years. In other words, the average mental development reached by these recruits was less than that of the average fourteen-year-old child. Out of about a million and a half men, 45,653 had less capacity than a ten-year-old boy.

Two main criticisms have been brought against the suggestion that probably fifteen or sixteen years is the average upper age limit for intellectual development. Firstly, it is argued that the tests are too coarse to measure the finer intelligence differences of the older groups; in other words, intelligence does develope, but our tests do not record it. This may be compared to efforts at measuring the diameter of a hair with a foot rule. Hairs do differ in diameter, but no foot rule will exhibit the differences. I am inclined to agree that this criticism is well founded. I find it hard to believe that intelligence developes fairly regularly up to a certain age and then abruptly stops.

Some evidence can be brought to support the view of a gradual slowing down of the rate of mental development rather than an abrupt cessation at fifteen or sixteen years of age. For the past three years all students have been tested shortly after their entrance to the Sydney Teachers' College. Some hundreds of measurements have now accumulated and show that by using carefully prepared tests small age differences may be demonstrated even up to twenty years. Our students range from seventeen years and from this age to twenty years there is a small but gradual increase in intelligence. After twenty years of age there is no appreciable advance. Of course, these students are a relatively highly selected body and, although we may here find that intelligence developes up to twenty years of age, I still think that the average upper age limit is about sixteen years. I should also mention that the tests used were such as could not be used for testing school children. Tests suitable for the latter would certainly not be fine enough to show differences in intelligence among such subjects as students of a teachers' college.

This leads up to the second criticism against the view of the early cessation of development, namely, that this result is due to the fact that the children measured are not a true sample of the higher age groups, but are in many cases the inferior portion of the total age group. For example, all our tests on primary school children show that intelligence is at its maximum in the thirteenth year. On the average children in the primary school who are in their fourteenth and fifteenth years, are intellectually inferior to the children in their thirteenth year. Yet no one would generalize from these results for the good and sufficient reason that after

twelve years of age it is impossible to get a fair sample of children in the primary school. The brighter children have all completed this stage by this time and are either in higher educational institutions or else earning their living. Our measurements contain far too many inferior subjects to be a true sample of the whole group. With the age limit of compulsory education at fourteen years, it is extremely difficult to get a true sample of children over twelve years of age. I think these two factors, the coarseness of our units of measurement and the selected nature of our subjects tested, are responsible for the apparently low upper limit of mental development. With more discriminating tests and finer units of measurement and with a truer sample of subjects I believe that this upper limit will be found to be considerably higher than fifteen years. Although the fact remains that by the age of fifteen years by far the greater part of our ultimate intellectual development has been achieved, nevertheless, as in the case of Teachers' College students, there are measurable differences up to the age of twenty years at least.

Application of Results.

Accurate intelligence ratings have a useful and varied application to educational problems; particularly is this the case with the intelligence quotient rating. I will briefly outline some of the main directions in which use can be made of such measurements.

As the intelligence quotient remains relatively constant throughout the developing period of life and as intelligence is the most important single factor in school progress, it is not surprising that educational institutions have widely used intelligence tests. In America particularly the intelligence rating is used largely as a basis for classification; it has almost completely ousted the old basis of chronological age. Although in this State the classification of children by age has been abolished, yet we still keep the sixth birthday as the time at which children should commence school. Out of 15,574 children in the lowest class in the public schools of Sydney in 1921 about 2,500 were repeating that class, *id est,* they had failed to qualify for promotion. An American study of the same state of affairs has revealed the fact that many children who enter school at six years, have a mental age considerably lower than six years and that to do satisfactory work in the first class at school demands a mental age of at least five and a half years. In all probability a similar examination of our own schools would reveal a similar cause. At present we are entirely ignorant of the degree of intelligence necessary for doing satisfactory work in any of the school classes. What is urgently needed in Sydney is an intelligence examination of every child immediately it enters school, or rather a few weeks afterwards, to insure favourable conditions of examination. In all large schools the children entering school could be divided into classes on the basis of their intelligence quotient measurement. All the evidence at our command shows that school progress is closely related to intelligence and that the rate of progress scholastically corresponds roughly to the rate of intellectual progress. Now if these children were divided into, say, three groups on the basis of their intelligence quotient, let us say children with intelligence quotients of over 120 in the highest group, those with intelligence quotients from 90 to 110 in the middle group and those with intelligence quotients of less than 90 in the lowest group, then it might reasonably be expected that the highest group would complete its education earlier than the other groups, particularly if they did not change teachers on promotion. In the highest group would probably be found those children who were potentially worthy of a full secondary education; those in the middle group would progress more slowly, but be able to do some super primary work such as forms the curricula of technical, commercial and domestic science schools; the lowest group would probably not be able to advance beyond the primary stage—they would go to work at fourteen years of age. Of course, I am only hazarding a guess at the probable course of development of these groups and I would expect that many children would have to be transferred from one group to the other, as intelligence, although the chief, is not the only factor on which school progress depends. What I have said, I think, shows that the mechanical arrangement of children in classes can be improved by taking into account the child's native endowment and that there would be a consequent improvement in the products of our educational system.

Further, such information can be of great importance to the teacher who is genuinely interested in the individuals of his class as well as in the class as a whole, in diagnosing the causes of disability or lack of progress. Let me take an illustration. A boy was brought to me who was thought by his parents and teachers to be of sub-normal intelligence. He was ten years of age and still in the infant school, which he should have left at least two years previously. The boy could not learn to read and spell and the teacher, thinking it was due to defective intelligence, evidently gave him up. Testing, even with the imperfect instruments which we are forced to use, soon showed that at least he was normal or nearly normal in intelligence. Thus a problem was suggested for solution and one possible cause had been eliminated. Further teaching showed that the boy was one of the "motor-minded" type who learn mainly through touch and movement, while his teacher had practically confined his methods to the usual avenues through which children learn to real and spell, namely, eye and ear.

A knowledge of the intelligence quotient of his class would be of great assistance to the teacher in similar problems to these, which are fairly common. It would be of further advantage to have another estimate of the child's intelligence somewhere about the tenth year as a check on the earlier examination and as a basis for the differentiation in education which must come about the twelfth year or soon afterwards. At this time education must become specialized to fit the child for his vocation. We hear a good deal concerning the poor material that enters the various professional schools at universities and a consequent demand is made for a tightening up of the entrance standard.

I believe that this condition is due to the fact that these universities take into account mere achievement with no attempt to measure native ability. Of course, intelligence will play its part in any entrance examination, but undue dependence upon memory by coaching and cramming can often result in the acceptance as suitable students of those whose natural abilities are not such as will enable them to pursue the admittedly arduous course of preparation for one of the professions. An accurate measurement of intelligence, say, at about ten or twelve years of age, would do much for parents and teachers in enabling them to make a better estimate of children's abilities. It would enable them to decide whether the primary course, with subsequent unskilled work, should be undertaken, whether further education, leading to a skilled occupation, should be sought, or whether the child should be sent on through a secondary school to the university or school of higher learning as a preparation for one of the professions. I am convinced that sooner or later society will demand some kind of prediction on the part of those who control the education of its youth, as for what vocation the child is best suited.

Conclusion.

Permit me in concluding this paper to mention briefly the state of affairs in New South Wales in regard to the measurement of intelligence. We must admit with regret that we have not got a single standard fixed and ready for use at the present time. At the Teachers' College we have a revised Binet test standardized up to the fourteenth year and we are having considerable difficulty in obtaining suitable tests for later years. However, we hope to have the whole complete in a week or two.

It is highly desirable to have also tests that can be given collectively to a group of subjects. Such procedure, although it results in a slight loss of accuracy, nevertheless effects a great saving in time. Such a set of tests is more than half completed, but cannot certainly be ready for use before the end of this year, even if the work should go on without interruption. Until such work as this is completed, we must regretfully admit that any accurate measurement of the intelligence of school children is impossible in this State.

THE DYSENTERIC INFECTIONS IN AUSTRALIA.[1]

BY C. H. SHEARMAN, M.B. (SYDNEY),
Government Pathologist, Perth, Western Australia.

THE primary object of this paper was to record the finding—as a result of a recent investigation—of an endemic centre in this State of infection with *Amœba histolytica*, the causative agent of protozoal or amœbic dysentery.

Incidence.

In the light of recent researches in Melbourne and Adelaide, the question of bacillary dysenteric infections is assuming a place of considerable importance in Australia, so I have thought it well to extend the scope of the paper to include a few remarks on the subject of dysenteric infections generally.

In the literature dealing with the amœbic type of dysentery and its concomitant, the liver abscess, I can find no reference indicating that the disease is anywhere endemic in the Commonwealth. Sporadic cases have occurred in various parts of Australia and have been reported from time to time, but few instances have been recorded in which the infection was indigenous.

Dew[1] reported two cases of amœbic abscess of the liver from Melbourne in 1921, but in both instances the patients had been exposed to infection outside Australia. Dew[1] also collected from the literature references to eight other patients with liver abscess, six from New South Wales and two from Adelaide. Four of the New South Wales patients appear to have been infected locally through a water supply which had become infected from a patient who had previously been operated on for the same condition.

In 1918 I recorded two cases of amœbic dysentery occuring in Perth[2] in which there was presumptive evidence that the infection had been locally contracted. In a third instance which I reported the same year with Nelson,[2] there was a possibility of infection having occurred in South Africa during the Boer War.

Colville[3] in 1922 reported four cases from Victoria in which the infection was contracted locally from a returned soldier and in March, 1923, Patterson,[4] of the Walter and Eliza Hall Institute of Research in Pathology and Medicine, recorded two cases from the Melbourne Hospital, the patients being women, neither of whom had ever been out of Australia. In one of these instances the husband of the patient had suffered from dysentery in the South African War and the patient herself had been subject to intermittent attacks of diarrhœa for the previous twenty years. In the other case there was doubtful evidence of infection from a recently arrived immigrant. As far as the records show, there is nothing to suggest an endemic centre of infection.

A recent investigation in Western Australia has shown that infection with *Amœba histolytica* is not uncommon in the eastern goldfields district of the State and indications point to the fact that cases of local infection have been occurring for some years.

Towards the end of last year the district medical officer at Kalgoorlie (Dr. S. Mathews) reported that cases of liver abscess were occurring with increasing frequency, that no less than twelve patients with this condition had been operated on by him during the year and that a number of patients with hepatitis had also come under his notice.

Prior to last year the condition had been met with occasionally, but its nature had never been investigated. When available, emetine had been administered to all such patients, in many instances with beneficial results; but the amount given to each patient had varied with the quantity at the disposal of the medical officer.

In January of this year I proceeded to Kalgoorlie

[1] Read at a meeting of the Western Australian Branch of the British Medical Association on April 18, 1923.

to investigate the nature of the infection in those patients suffering from liver abscess who were available for examination. Unfortunately, only three of the patients were then in Kalgoorlie. Of the remainder, one had died as the result of the condition and the others had left for outlying districts.

Examination of specimens of fæces from these three patients was made, the results of which, together with a history of each patient, are given hereunder:

I. E.L. was born in Australia and had never been out of the Commonwealth. She had lived in various parts of the eastern goldfields district of Western Australia for the previous twenty years. She had a severe attack of dysentery fifteen years ago when living at Leonora and was operated on for liver abscess in October, 1922. Emetine was administered. Examination of the fæces showed large numbers of cysts of *Amœba histolytica*.

II. G.B., a Dalmatian, had been a resident on the goldfields for some years. He gave a history of dysentery which was indefinite. He was operated on for liver abscess in 1922. Treatment with emetine was carried out. No cysts of *Amœba histolytica* were seen.

III. S., a Slavonian, gave a history similar to that of the preceding patient. No cysts of *Amœba histolytica* were seen.

In regard to the two latter patients, difficulty was experienced in obtaining satisfactory samples of fæces; only one sample was examined in each instance and one of these was practically valueless for the purpose required.

The following facts were ascertained relative to four of the remaining patients: Two were born in Australia and had never been out of the Commonwealth, while two were foreigners (one an Italian, the other a Slavonian). One of the Australian-born patients had lived some time ago in a camp in close proximity to the patient (E.L.) in whose fæces large numbers of histolytica cysts were found. No facts could be ascertained with regard to the remaining five patients.

A survey was then made of the patients in the Kalgoorlie Hospital in order to ascertain what intestinal parasites, if any, were prevalent among residents of the district and more especially to determine whether any carriers of *Amœba histolytica* cysts could be detected. At the time there were no patients with dysentery in hospital and none of the patients had suffered from liver abscess.

Fæces from thirty-five patients were examined with the following results:

(*i.*) Three patients were found to be harbouring cysts of *Amœba histolytica*.

(*ii.*) Eight patients (including the three just mentioned) were harbouring cysts of *Amœba coli*; active amœbæ were also present in two of these.

(*iii.*) One patient was infected with *Lamblia intestinalis*.

(*iv.*) Three patients were harbouring *Tetramitus mesnili*.

(*v.*) *Blastocystis hominis* was found in the stool of one patient.

(*vi.*) One patient was infected with *Trichurus trichiurus*.

Of the three patients harbouring cysts of *Amœba histolytica*, two were Australian born and had never been out of the Commonwealth; the third was a foreigner (Italian) and a recent arrival in the country. In addition to cysts of *Amœba histolytica* the fæces of the Italian were found to contain free *Amœbæ coli*, free tetramitus and ova of trichurus. The two Australian-born carriers both worked on the Kurrawang Wood Line. One had suffered intermittently from a condition diagnosed as dysentery for some years. He had had a severe attack two and a half years ago. The other had never had dysentery until going to Kurrawang, but since living there for ten months he had had several attacks.

Five other patients, in addition to these three carriers of the *Amœba histolyctica*, were found to be harbouring cysts of *Amœba coli*. This organism, though apparently of no pathological significance, assumes a cystic form just as does the pathogenic *Amœba histolytica*. Infection of man with *Amœba coli* occurs in similar manner to infection with the pathogenic variety, *id est*, by ingestion of foodstuffs *et cetera* contaminated with the cysts. Its detection in the fæces is therefore of importance, especially when found in the high percentage (23%) that occurred in Kalgoorlie, since it indicates that conditions for the spread of infection both with *Amœba coli* and *Amœba histolytica* must be favourable.

Of these five patients, three were Australian born and had never been out of the State; one of them was an aboriginal half-caste. The remaining two were born in England, but one had been in the State for forty-three years and gave a history of having suffered from a condition resembling chronic dysentery on the Murchison goldfields. The other had lived in Victoria for some years, but had been resident six months in Kalgoorlie. He gave a history of having suffered from periodic attacks of a condition resembling dysentery while in Victoria and had a severe attack twelve months ago.

The flagellate infection (*Lamblia intestinalis*) occurred in a child (Italian), the infection being exceptionally heavy.

To summarize briefly the result of this investigation: One case of liver abscess was proved to have been amœbic in type and the improvement under emetine in the other cases, when sufficient quantity of this drug was available for administration, indicates that tropical liver abscess has been occurring with marked frequency on the goldfields of this State. In three of the seven patients of whom details could be obtained, the infection could only have been contracted locally. In addition, three carriers of *Amœba histolytica* were detected among thirty-five patients in the Kalgoorlie Hospital, two of whom could only have become infected locally. The patients in hospital at the time this survey was made were representative of the present population of the goldfields and were not chosen because of any antecedent history of dysentery, nor had any of them suffered from liver abscess. Eight of the patients in hospital were found to be carrying cysts of *Amœba coli*, infection with which occurs in a similar manner to and usually runs hand in hand with infection of *Amœba histolytica*. The majority of these patients had been infected locally.

With regard to the introduction of the infection

into this State and the length of time it has been present, there is nothing in the information available to connect it with the return of soldiers infected at the war. On the contrary, it would appear that the disease was endemic in the district for some years before the war.

Dr. W. P. Seed, who was practising for some years in Coolgardie in the early days of that goldfield, has informed me that he operated on a considerable number of patients with liver abscess while at Coolgardie and that at that time acute dysentery was by no means uncommon. In one of the cases in the present series, the patient (E.L.) who was found to be a carrier of histolytica cysts, gave a history of a severe attack of dysentery contracted at Leonora fifteen years ago and some years later a man living in a camp adjacent to this patient developed a liver abscess. This suggests that the attack of dysentery fifteen years ago was amœbic in type and that the patient probably remained infectious from that time. Dr. Juett, who was practising at Cue before the war, has informed me that he saw a number of instances of dysentery there and that some of them were accompanied by fatal results.

The eastern goldfields district has always carried a cosmopolitan population; many of the foreigners have come from countries along the Mediterranean littoral where amœbic dysentery is endemic and among the poorer class residents of which freedom from infection is the exception rather than the rule. Four of the patients in the series of those suffering from liver abscess and one histolytica cyst carrier detected among the hospital patients were foreigners from Southern European countries and there is, in my opinion, little doubt that the infection was introduced years ago by an influx of these people to the mining districts. Climatic conditions on the goldfields are such as would favour infection with amœbic cysts, both the fly and dust nuisance being very troublesome. There is no general water-carriage system of sewage; the pan system is almost in universal use. The main danger occurs not in the larger townships where the sanitary conditions are on the whole good, but in the outlying camps, especially those of a temporary nature such as are met with along the Wood Line and on all the new goldfields. Unfortunately we have no reliable record of the incidence of amœbic dysentery in the goldfields district. There are no laboratory facilities existing at Kalgoorlie for bacteriological or microscopical diagnosis and the distance from Perth precludes any reliable results being obtained, especially in acute stages of the disease, from specimens sent to the Perth laboratory. For the same reason it is difficult to estimate the extent to which dysentery, either amœbic or bacillary, prevails throughout the State.

These diseases were made notifiable only in 1919 and since that time the following cases have been officially reported: 1920, forty-nine cases (including sixteen military cases and nineteen cases of asylum dysentery); 1921, twenty-one cases (including four cases of relapsing dysentery in patients previously notified and thirteen cases of asylum dysentery); 1922, ten cases.

The diagnoses of these infections were not all confirmed by laboratory examination. Thus in 1920 fourteen instances of amœbic and two of bacillary infection were detected in the laboratory. In 1921 six instances of amœbic and four of bacillary infection and in 1922 five of amœbic and one of bacillary infection were similarly detected. The seven strains of *Bacillus dysenteriæ* isolated belonged to the mannite-fermenting group; six were Flexner in type, while one gave the reactions of Strong's bacillus, but this latter was not confirmed by agglutination tests.

It is very probable that infection with *Bacillus dysenteriæ* occurs to a much greater extent than these figures indicate. Isolation of the organism from the fæces is by no means an easy matter and can be accomplished only if conditions for obtaining specimens are ideal. The conditions necessary for successful cultivation of the organism are that the specimen be obtained early in the course of the disease and that it be submitted for examination within two or three hours of defæcation. Even under these conditions attempts to isolate the organisms are attended with success in only 60% or 70% of cases, so that the results of cultural examination do not offer a true criterion of the incidence of infection.

Up to the present time, Australia has been free from dysentery in epidemic form of any severity. The investigations of Patterson and Williams[5] in Melbourne and of Beare[6] in Adelaide have recently shown that bacillary dysentery, which is the type most likely to assume epidemic proportions, is endemic in at least two of the Australian States and that infection with *Bacillus dysenteriæ* is much more common than is generally believed. These investigations have shown that in Australia, as elsewhere, the dysentery bacillus is responsible for much of the gastro-enteritis and diarrhœa occurring in infants and children and Patterson and Williams[5] also showed its connexion with epidemic diarrhœa of adults occurring in Melbourne. The latter workers in a series of ninety-nine cases of diarrhœa and enteritis recovered Flexner dysentery bacilli from the stools of 60% of the patients with the acute form of the disease and from the stools of 34% of those with the chronic form. Beare[6] in Adelaide, in a series of two hundred and seven infants and children with diarrhœa and enteritis, found that seventy-eight (38%) were suffering from what was clinically bacillary dysentery, the diagnosis being confirmed in most instances by isolation of the organism.

No systematic investigations have been made in this State to determine the prevalence of infection with the dysentery group of bacilli, but there is no reason to doubt that as a causative factor in the gastro-enteritis of children or epidemic diarrhœa of adults it is any less prevalent here than in the other States.

Prior to the outbreak of war little interest was attached to the presence of dysentery in Australia and it still appears to be regarded as practically non-existent. This is evidenced by a fact which Beare points out in his recent paper, namely, that in the latest "Official Year Book of the Commonwealth of Australia" (1921) no specific entry for

dysentery (either amœbic or bacillary) is found among the causes of death in the section dealing with vital statistics. Further investigation of the "Year Book" shows that among the deaths occurring under the heading "other epidemic disease," eighty-three were attributed to dysentery during the year, while deaths from diarrhœa and enteritis for the same period numbered 3,544, of which 2,589 occurred in children under two years of age and 985 in adults and children over two years.

In view of the part that the dysentery bacillus has been shown to play in the causation of these conditions, one wonders how many of the three and a half thousand deaths were really due to infection with this organism and contemplates with regret the number that might have been saved had the true condition been recognized and specific treatment adopted.

It must be remembered that the figures given in the "Year Book" reflect the diagnoses made by the medical practitioners of Australia, for the various causes of death given are culled from the certificates of death signed by members of the medical profession. It would appear, therefore, that in spite of the experience gained during the war period, the recognition of dysentery as a disease affecting the civil population of Australia is being long delayed. Nor is the general body of practitioners alone to blame for this delay. The possibility of the disease proving a menace to Australia appears to have been overlooked by the various health authorities throughout the Commonwealth. Prior to this year this State was the only one in which dysentery was a notifiable disease for the whole State. In Queensland it was made notifiable in respect of the Thursday Island district in 1911, in consequence of a severe outbreak which occurred there, but is not notifiable in other parts of the State. From the commencement of this year cases have been notified in Victoria.

Diagnosis.

Statistical returns of cases of dysentery are of little value, unless based on laboratory diagnoses, and except in the metropolitan areas few facilities exist in any of the States for laboratory examinations to be carried out. If the latter are to be of value, specimens must be examined with expedition and a delay of even a few hours is liable to render examination abortive, so that country practitioners have little opportunity in this respect. In the absence of laboratory examination the response to specific treatment may be sufficient to indicate the type of disease, but this method of effecting a diagnosis, while providing a more or less reliable statistical return, is hardly to be recommended in the patient's interests.

From what has been said regarding the difficulties accompanying the isolation of the specific organism in patients with bacillary infection, it may be thought that it is hardly worth while troubling to have specimens examined, since if no amœbæ are found and no organism isolated, the diagnosis would still remain in doubt.

If amœbæ are not found after careful search in a fresh specimen from a patient who has had no treatment with emetine or ipecacuanha, there is strong presumptive evidence that the case is bacillary in nature. But apart from discovering the presence of amœbæ, microscopical examination of the stool affords information of considerable value. In a paper published in 1918 Willmore and the writer,[7] as a result of experience gained in examining a large series of cases in Egypt, drew attention to the diagnostic value of the character of the cell exudate in the stools of patients with acute amœbic and bacillary dysentery. Close attention to this point will enable much information to be gained and so microscopical examination of the stool should never be omitted.

As a result of his investigations among children in Adelaide, Beare[6] is of the opinion that "there is every justification for the statement that the majority of patients (children) passing blood and mucus in the stools are suffering from bacillary dysentery."

If this were adopted as a working rule in the diagnosis of gastro-enteritis of infants and children and specific treatment (*id est*, anti-serum) were instituted in such cases the mortality from gastro-enteritis and diarrhœa should be considerably decreased, while no harm would be done if the treatment were administered to the few patients who might erroneously be included.

Apart from the presence of blood and mucus in the stool, Beare is of the opinion that *Bacillus dysenteriæ* (Flexner) practically does not occur in the motions of children. Unless children differ markedly from adults in this respect, I am of the opinion that this latter statement is open to criticism. Those who had experience of dysentery at the front, will remember the number of cases of epidemic diarrhœa occurring concurrently with cases of genuine dysentery, but without the obvious blood and mucus characteristic of the latter.

Dysentery bacilli were recovered from the stools of a sufficient number of these patients to show that the condition was actually a dysenteric infection of mild type. Beare's conclusion in regard to the absence of *Bacillus dysenteriæ* from children's stools which lack obvious blood and mucus, was formed after failure to isolate the organisms in a relatively small number of instances and it must be remembered in this connexion that in the diarrhœa of infants the stools frequently contain large amounts of fatty acids to which dysentery bacilli are particularly sensitive. This factor thus adds to the difficulties of isolating the organism. Moreover, many stools in which the presence of blood and mucus would not be very obvious on naked eye examination, show when examined microscopically the presence of both blood and mucosal cells in sufficient quantity to indicate that some pathological process involving the intestinal mucosa is present.

Patients with these mild infections, however, usually do well without specific treatment, but they create a danger because there is more likelihood of the infection spreading on account of the non-recognition of the condition.

In adults, while the presence of blood and mucus may be sufficient in the absence of other data to the

contrary to indicate a dysenteric infection, it would be impracticable to regard all such cases as being bacillary in type, as may be done with infants among whom amœbic infection is rare. In adults and especially in sporadic cases of the disease the possibility of amœbic infection cannot be overlooked. Amœbic dysentery, being a disease of protozoal origin, is much less infectious than the bacillary type and, unlike the latter, does not tend to occur in epidemic form, so that there is more likelihood of its presence being overlooked, especially if no microscopical examination of the stool be made. In the past the possibility of amœbic infection could in most instances be dismissed by an inquiry as to whether the patient had ever visited tropical countries where the disease was known to exist. Many returned soldiers—and especially those who served in the eastern war area—are undoubtedly harbouring cysts of *Amœba histolytica*, so that amœbic infection is now likely to occur in any part of Australia. It is also possible that other centres exist in Australia where conditions are similar to those found in the eastern goldfields district of this State and any centre where there has been an influx of foreign population from countries in which the disease is endemic, should be regarded as a potential area of infection.

Treatment.

The question of treatment hardly comes within the scope of this paper, but will receive brief mention in reference to its effect on the subsequent infectivity of the patient. The method of treatment is specific for each of the two main types of disease. Briefly it may be stated that the amœbic variety is treated by the administration of emetine salts and suitable dieting, the bacillary variety by anti-serum, sulphates and suitable dieting. With the recognition that bacillary dysentery is essentially a toxæmia comparable to diphtheria, the old method of locking up the bowel secretions by administering opium, bismuth *et cetera* and so increasing the toxæmia, is no longer employed. Free elimination of toxins by the use of sulphate aperients in the acute stages of the disease is recognized as a much more logical method. Excessive dehydration of the patient is prevented, if occasion arise, by the use of intravenous or subcutaneous saline solution or gum solution. Both the infection and the toxæmia are counteracted by the early administration of massive doses of specific anti-serum which is anti-bacterial and antitoxic in its effect.

In an acute case the initial dose of anti-serum should be from sixty to one hundred cubic centimetres given intravenously or subcutaneously. The dose and method of administration will vary with the severity of the attack. If necessary the same dose is repeated next day. To children under two years of age Beare recommends giving ten cubic centimetres subcutaneously daily for four days and to children over two years thirty cubic centimetres subcutaneously daily for four days. The efficacy of serum treatment has been proved beyond all doubt. It would be difficult to estimate the number of lives saved by this means in cases occurring during the recent war. I have seen no figures relative thereto, but in my own relatively small experience in a series of some few thousand patients in one hospital only, it would not be an exaggeration to state that some hundreds at least owed their lives to prompt administration of anti-serum. Willmore,[8] with whom I worked in Egypt, published some figures giving his experience at El Tor among pilgrims going to Mecca. The percentage mortality was 70% when no serum was available, but with the use of serum the mortality dropped to 12%.

In Adelaide in a comparatively small series of cases in infants, Beare states that the mortality dropped from 36% to 16% as the result of serum treatment, but two of the patients who died, did not receive serum treatment until the twenty-fifth and thirteenth days respectively after the onset of illness. Of those who were given such treatment and recovered, 71% received serum within a week of the onset of illness.

The early administration of treatment in either type of disease is of importance, not only from the point of view of the patient's immediate well-being—and in the fulminating bacillary type this is supremely important, owing to the rapid overwhelming of the patient with toxin—but also as bearing on the subsequent liability of the patient to remain infectious.

In this connexion it must be remembered that the main period of infectivity in the bacillary form is in the acute stages of the disease, but in the amœbic type the patient does not become infectious until the cystic form appears in the stool. This depends on the rate at which the amœbæ multiply in the mucosal tissue. Carriers of both types of disease exist, but whereas the bacillary carrier probably only becomes a danger when suffering from a relapse of his disease, the amœbic cyst carrier is at all times dangerous.

Early institution of correct therapeutic measures will tend to obviate the carrier state. The cystic form of *Amœba histolytica* is very resistant to emetine and prolonged courses of this drug are necessary to clear up such an infection. In the active vegetative form the amœba is very sensitive to the action of emetine, so that treatment instituted early in the course of the disease, before cyst formation has gone on to any extent, is more likely to prove efficacious in rendering the patient subsequently non-infectious.

Similarly in the bacillary type of disease, early administration of serum is in favour of obviating the carrier state, the reason being that the serum has an anti-bacterial action, and if this is brought to bear on the organism in sufficient doses before it has become accustomed to its environment, there is less chance of the carrier state developing.

In the absence of any laboratory aids to diagnosis the following points may be of use in deciding on the nature of the infection.

A case ushered in with marked symptoms of toxæmia should be regarded as bacillary in nature. Both the Shiga-Kruse and mannite-fermenting types of *Bacillus dysenteriæ* produce a soluble toxin which may rapidly prove fatal to the patient or may produce later degenerative changes in the liver, kidneys or myocardium. I have seen patients with the

fulminating type of bacillary dysentery, usually due to the Shiga-Kruse type of infection, die within twenty-four hours of the onset of symptoms from acute toxæmia. The Flexner type of infection is usually less toxic than the Shiga-Kruse and fortunately this type appears to be the more prevalent in Australia. This variation in virulence cannot be taken as affording a means for discriminating between the two types of bacillary infection. Shiga infections may pursue a very mild course, while some Flexner infections may show intense toxicity.

The amœba, on the other hand, does not produce a soluble toxin and toxic symptoms are not a characteristic of the early stages. They may appear later from secondary infection through the amœbic ulcers with a streptococcus.

For the same reason the onset of amœbic dysentery is usually more insidious than that of the bacillary type. In some of the fulminating cases of the latter, the onset may be so rapid as to suggest cholera. A tendency to epidemicity may be taken as indicating a bacillary infection, though sporadic cases of this type may also occur. Cases characterized by the passage of blood and mucus and occurring in the course of "summer diarrhœa" of children or gastro-enteritis of infants should be regarded as bacillary in nature.

When the condition is acute and some doubt exists, it is better to regard the infection as bacillary in nature and begin treatment at once with large doses of anti-serum. If this is given early and in sufficient quantity (sixty to one hundred cubic centimetres as an initial dose), the response is usually so definite as to leave no doubt as to the nature of the infection. If the condition is not bacillary in nature, the administration of anti-serum will not cause any improvement—it will also do no harm—and emetine may then be administered. While a delay of a few days in giving emetine may not seriously affect a patient with amœbic dysentery, the same delay in administering anti-serum to a patient with the bacillary infection may prove fatal or may result in a subsequent nephritis or myocarditis or in months of invalidism and abdominal misery. Moreover, while the administration of anti-serum to a patient suffering from the amœbic type is harmless, the same cannot be said of emetine when given to patients with a bacillary infection. Emetine has a depressant action and should only be given when the disease has been definitely diagnosed as amœbic in nature, or when failure to react to anti-serum indicates the probability of amœbic infection. A myocardium damaged by the toxins of bacillary dysentery is not always in a fit state to withstand the effects of a course of emetine treatment. In the early days of my Egyptian experience, before we realized that the type of infection had changed, as it did suddenly change from the amœbic to the bacillary type, three patients with the latter infection died suddenly from heart failure after a course of emetine treatment.

Conclusion.

The object of this discursion into the realms of bacillary dysenteric infection is not to preach the gospel of a new disease in Australia, but to focus attention on the fact which has been so ably demonstrated by Patterson, Williams and Beare among the more recent workers and by Litchfield, Hipsley and Bradley in Sydney and Forsyth in Melbourne some few years ago, that bacillary dysentery is and has been endemic in Australia for many years. The only conclusion to be drawn from the death statistics for the Commonwealth is that, though present, the disease is not being recognized as a clinical entity.

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Reports of Cases.

CÆSAREAN SECTION AND HYSTERECTOMY IN A PATIENT WITH CONTRACTED PELVIS AND OCCIPITO-POSTERIOR PRESENTATION.

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I AM reporting this case on account of several unusual features.

Mrs. C., aged forty-three years, was admitted to the Women's Hospital at about mid-day on February 27, 1923. She had previously had one miscarriage during the third month of pregnancy. She had no children. Her last menstrual period had been on May 15, 1922.

On admission it was found that the fœtal head was not engaged, but could be pressed into engagement. There was no overlapping at the pubis. The heart sounds of the fœtus were normal; the patient's tongue, pulse and temperature were normal. Abdominal palpation showed the fœtus to be in the right occipito-posterior position and vaginal examination showed dilatation to be "one shilling." The membranes were unruptured. The pelvic measurements were as follows: Interspinous measurement, twenty-six centimetres (ten and two-fifth inches); intercristal measurement, twenty-eight centimetres (eleven and one-fifth inches); external conjugate, twenty and a half centimetres (eight and one-fifth inches).

At 3.30 p.m. the dilatation was "half a crown."

At 8.45 p.m. the dilatation was "five shillings" and the head was advancing. A hypodermic injection of morphine (sixteen milligrammes, *id est*, one-quarter of a grain) was given and the patient obtained some sleep.

On February 28, 1923, very little progress of the head had taken place, in spite of good contractions. The membranes had ruptured. Dilatation was nearly "full." Under anæsthesia I inserted a gloved hand into the vagina and rotated the fœtus bimanually into an anterior position. The hand in the vagina disclosed a contraction in the middle of the pelvis and toward the outlet. The contraction was in the transverse diameter and was due to the fact that the ischia approached one another too closely.

Dr. S. H. MacCulloch saw the patient in consultation and advised Cæsarean section. The patient's general condition was good and the fœtal heart sounds were normal.

Operation was undertaken about mid-day. Ether anæsthesia was administered by Dr. Green. Dr. A. J. Gibson assisted me at the operation, Dr. Green acting as second assistant. The abdomen was opened in the middle line, about ten centimetres (four inches) above and ten centimetres below the umbilicus. The uterus was opened in the same line and the fœtus and decidua were extracted. The incision through the uterine wall passed through a fibroid larger than a large orange and other fibroids were present. The incised fibroid was partly interstitial, but projected into the cavity of the uterus. It could not be seen on the peritoneal surface. Contraction of the uterus was not very good on account of the fibroids.

The opinion of Dr. S. H. MacCulloch, who was present, was obtained and it was decided on account of the grave risk of *post partum* hæmorrhage to remove the uterus.

Supra-vaginal hysterectomy was performed and the abdomen closed.

The child was alive, was a male and weighed two and a half kilograms (five and three-quarter pounds) at birth and three kilograms (seven pounds) when the mother was discharged from hospital.

Convalescence was quite uneventful until the twenty-fourth day, when the temperature and pulse rose. This was due to a breast abscess, which was opened and drained. This was not completely healed until the fortieth day.

The patient was discharged on the forty-second day in excellent health and with a small, but healthy baby.

Discussion.

The points of interest about this case are, first of all, the unusual type of pelvic contraction. This would not be detected by ordinary ante-natal examination. External pelvimetry is useless in this type of deformity. I do not place much reliance on external pelvimetry at any time, except in so much as it brings an obvious contraction under notice. But I rely to a very large extent on Munro Kerr's sign, overlapping of the fœtal head over the pubis. This is detected by placing the two thumbs flat and transversely on the fœtal head and pubis of the mother. The head can then be used as a pelvimeter or a measure of the pelvis by pressing the fœtus down and feeling how far it can be made to enter the pelvic inlet. Due allowance must be made for an occipito-posterior position if such is present. This is a measure of the pelvic inlet on which reliance can be placed.

In the second place, there was no marked lordosis or sign of alteration of pelvic inclination, so that all the routine examinations would fail to disclose the contraction in this instance. The contraction could only be detected by special vaginal examination. Contractions toward the pelvic outlet will usually escape detection at routine ante-natal examinations. In this instance, on the evening of her admission, I considered that the delay was due to the age of the patient and the occipito-posterior position.

Another point of interest is the question of hysterectomy in performing Cæsarean section in the presence of fibroids. In this instance the age of the patient and the presence of several fibroids were points in favour of hysterectomy. The uterus with interstitial or submucous fibroids is very liable to *post partum* hæmorrhage and due consideration must be given to this fact.

Reviews.

PARASITES OF MAN AND BEAST.

THE new edition of the "Précis de Parasitologie," edited by E. Brumpt,[1] will be welcomed in pathological and other laboratories and will be very useful to workers in general parasitology and to medical practitioners. It is a compact, splendidly illustrated volume of twelve hundred odd pages, yet by the use of a high quality, thin paper in size it is by no means bulky.

Since the last edition in 1913 there has been a considerable increase in our knowledge of human parasitology, largely due to the great output of work by groups of medical and other laboratory workers mobilized during the war.

This book has been brought well up-to-date and there is found even such recent work as that of Couvy, who in 1921 reported the discovery of spirochætes in the blood of dengue fever patients. In passing it may be mentioned that due notice is taken of the work of Cleland and Bradley on the carriage of the parasite of Queensland dengue fever by the mosquito *Stegomyia fasciata*.

We have tested the index and text of the "Précis" in many ways and found it responded in an excellent fashion in giving as full particulars as could reasonably be expected. The bibliography has gone by the board, crowded out by the increase in the text of the volume, but here and there handy references are found in footnotes.

The account of the protozoa, which constitutes a quarter of the book, is well proportioned; forms, such as *Giardia (Lamblia) intestinalis*, are efficiently illustrated and described. This organism was a common cause of diarrhœa in Gallipoli; it is present in over 10% of the inhabitants of Queensland and is not uncommon in other parts of the Australia.

The account of the helminth parasites of man occupies some four hundred pages. Brumpt would go so far as to say that almost all the problems of human helminthology have been solved.

In 1913 only the life history of *Fasciola hepatica* was known and this was a rare human parasite. Since then the life cycles among others of *Fasciolopsis buski*, a common intestinal fluke of the Chinese, *Paragonimus westermanni (Distoma pulmonale)* of the Chinese and Japanese and the three species of *Schistosoma (Bilharzia)* have been discovered. Among the *Cestodes* the life history of *Dibothriocephalus latus* has been cleared up.

The section dealing with the nemathelminthes shows many excellent and useful figures. The life histories of *Ascaris lumbricoides* and *Trichocephalus trichiurus* (synonym *Trichocephalus dispar*), believed once to be quite simple, are as shown by recent investigations as elaborate as those of the anchylostomids. Stewart in 1916 demonstrated that the cycle of *Ascaris lumbricoides* was not a simple development in the intestines of its host, for in rats and mice the larval worms pass in the blood stream and connective tissue from the intestines to the liver and so to the lungs in a manner similar to that of *Anchylostomum duodenale*. Further work by Stewart, Ransom and Foster established this fact. In rats and mice the migrations in the lungs of the larval worms may cause a fatal pneumonia. After development in the lungs these organisms pass by the œsophagus to the intestine. Clinical observations of human beings infected experimentally show that pulmonary inflammation is produced by them. Considering the frequency of massive infestation of children by *Ascaris* in certain parts of Australia (such as the north coast of New South Wales) these new facts of the development of this worm may have considerable clinical importance to Australian practitioners. *Trichocephalus trichiurus* probably exhibits the same pulmonary migration of larvæ. This interesting mode of development, once thought to belong only to *Anchylostomum*, has been extended to include several other nematode families. The account of the ticks, mites and insects is refreshingly up-to-date. New facts of the toxicity of certain ticks in human beings are recorded and among them the occurrence of paralysis following the attacks of the common dog or scrub tick of Australia (*Ixodes holocyclus*), as reported by Todd and Cleland. The important work of Bacot and Martin on the manner of transmission of *Bacillus pestis* by the flea, *Xenopsylla cheopis*, is properly described and clearly illustrated by Bacot's figures and the description of other dipterous insects, especially the mosquitoes and their larval stages, is particularly good. Over two hundred pages are devoted to the consideration of the vegetable parasites. We know of no more handy compendium of this increasingly important group. The article on blastomycosis includes the most recent work, but there is no mention of Stoddard and Cutler's (1916) account of certain cases of blastomycotic meningitis in the United States of America closely resembling those which have recently been described in Australia. Finally, in the words of Brumpt,

[1] "Précis de Parasitologie," par E. Brumpt; Troisième Édition, entièrement remaniée; 1922. Paris: Masson et Cie; Crown 8vo., pp. xv. + 1,216, with 736 figures, of which 302 in the text and five plates are in colour. Price: Frs. 50 net.

the people of France can rejoice because, "despite the constant introduction of parasites by troops from foreign parts, these parasites have not been able to find upon our soil a terrain favourable for their development"—and Australia has had the same fortunate experience.

CLEAN SEXUALITY.

THE subject of the sexual relations between men and women has caused more heart-burnings and difficulties than any other problem in life. In the history of the world there are alternating periods of licence, outspoken freedom and lewdness and puritanical reticence, leading to an artificial mystery concerning things that need not be obscure. The second period is a reaction on the first. When immodesty and wantonness mark an age of increasing openness in conversation and in behaviour, there is a tendency for men and women to permit immorality and ribaldry to pervade society. After a time the world becomes sickened by the ever-increasing licentiousness, with the result that the reaction sets in, a reaction phase of secrecy, unnatural silence and a pretended morality. The Victorian age was characterized by this hypocrisy. Human nature was the same in the latter half of the nineteenth century as it was in the so-called Florentine age. It was a period of unnatural exclusion of natural topics from frank discussion and yet the problems were exactly the same. The war following a drawn-out peace determined the end of this phase. Even before the war books, magazine articles and newspaper paragraphs dealt with the prevalence of venereal disease, with the Freudian conception of repressed emotions and with the moot question of the instruction of the young on sexual matters. It was as though immorality had suddenly appeared and needed to be met by new measures. When the incidence of venereal infections actually became greater as a result of the opportunities created by war, the public awakened to the importance of the sexual problem and forsook the inconceivable attitude so long in vogue of an apparent denial of the truth. This hysterical outburst of public sentiment did no good. It was based on a misconception of sexuality and was in consequence doomed to failure. Forel, Krafft-Ebing and a few others had already attempted to remove the whole subject from the artificial environment that had arisen as a result of misunderstandings. Their endeavours, however, savoured too much of the pathological to influence the great public and to many their scientific writings were classed among the lewd contributions appealing to a sensual craving.

Early in 1918 Dr. Marie Stopes attacked the subject from a totally different aspect. She was not the first to select this channel, but few if any had previously brought to bear on it such a peculiar mixture of physiological truth and pure human sentiment. Her extraordinary book, "Married Love," created a great stir, as it was bound to do.[1] It disarmed the purists' criticism by its frank sacredness; it offered problems to the physiologist that could not be brushed aside and that must be examined from a cold, matter of fact point of view. That it has reached its tenth edition and that two hundred and one thousand copies have been sold might have been explained on the ground that it had appealed to the baser feelings of the animal man. No one who has read this little volume with understanding, could for one moment adopt such a view. Its enormous popularity is attributable to the fact that Dr. Stopes has approached in the most courageous manner this tender subject without loss of dignity, without becoming coarse and without once losing sight of her one objective, the enhancement of the sum of human happiness.

Dr. Stopes has a theory, based on careful observation and extensive investigation. She had found that the apparent coldness, capriciousness of the ordinary woman is traceable to her frequent failure to meet a sexual impulse by a reciprocal response. According to her experience, every individual yearns for a mate and finds the most intense, the most sacred joy in the unity of bodies as well as souls, provided that this consummation is the natural expression of his or her desires. She is convinced that unhappiness in marriage is the result not of any want of initial affection, but of ignorance of the fact that woman at all events experiences a rhythmical sex impulse, a period of desire which lasts but a relatively short time and which is extraordinarily powerful. She explains this sex impulse as a physiological stimulation that arises spontaneously and quite apart from any particular man. She holds that it is actually a creative impulse and consequently an expression of vitality. While she admits that there are many individual variations, it would seem from her inquiries that the wave crest of sexual impulse occurs with remarkable regularity two or three days before menstruation and eight or nine days after the end of the menstrual period. During the two recurring phases, the woman is capable of completing the orgasm. She teaches that, owing to ignorance of this, many fond husbands cohabit with their wives during the ebb of the sexual tide, when there is no natural, spontaneous desire and little prospect of response, of mutual orgasm. She goes still further She holds it to be essential that a loving husband should acquaint himself of the wave crests of this sex tide and before each act of union should woo her afresh, awakening in her by every means in his power a craving for a joy that is beyond compare. It is not improbable that this rhythm is a physiological fact. Her art in expressing in poetic words these most intimate matters without a suggestion of uncleanness or of vulgar indecency renders her plea for the woman all the more irresistable. She writes, naturally enough, as a woman and perhaps there are some exaggerations, even in her philosophy, certainly in her physiology. In a very beautiful outburst on the ecstacy of a perfect married love, she would clothe every beloved being in a beautiful body. While she advises the wife to refuse her husband admission to her room when she is performing so unlovely a task as screwing up her hair into a tight and unbecoming knot or soaping her ears, she recommends her to charm her wedded lover by the sight of a beautiful woman floating in the deep, clear water of her bath. Unfortunately not every woman's unclothed body is lovely. But these little divergencies of Dr. Stopes are few and not serious. They do not detract from the value of her doctrine, a doctrine which would largely solve the real sexual question, were it universally recognized and adopted.

Dr. Stopes deals with many other aspects of this important, difficult question. In her hands it does not become dangerous. She speaks frankly but not brutaly of mutual adjustment and of the necessity for completion of the act of union, completion in its real sense. She finds utter exhaustion followed by refreshing sleep a physiological, natural reaction of a period of intense rapture. In this connexion, as in several others, she gently chides the man for his stupidity in ignoring the evident signs of his wife's desires. She deals with abstinence in a practical, reasonable way and with the procreation of children.

To unfold each and every argument would necessitate a quotation from every page and the paraphrase would be less enticing and less convincing than the original. Every man and every woman may learn something of the nature of their love from this delightful and romantic essay on the married state.

[1] "Married Love," by Marie Carmichael Stopes, D.Sc., D.Ph., with a Preface by Dr. Jessie Murray and a letter from Professor E. H. Starling, F.R.S.; Tenth Edition, Revised; 1922. London: G. P. Putnam's Sons, Limited; Sydney: Angus and Robertson, Limited; Demy 8vo., pages 191. Price: 3s. 6d. net.

PHYSICAL EXAMINATION OF THE CHEST.

ON reading through Crocket's book on the physical examination of the chest[1] the first impression created is that of the clear and careful description of the simple and searching clinical routine as carried on by the author. In addition to this, the excellence of the many illustrations cannot fail to impress the reader. Many interesting historical notes have been included and the author has served up many fitting quotations from the sayings of famous leaders in medicine.

[1] "Physical Examination of the Chest, with Special Reference to Pulmonary Tuberculosis, Including a Chapter on Tuberculosis of the Larynx," by James Crocket, M.D., D.P.H., M.R.C.P.E.; 1922. London: H. K. Lewis & Company, Limited; Crown 8vo., pp. 254, with 56 illustrations, including 14 plates. Price: 9s. net.

In the first chapter, which is well illustrated, the author discusses the anatomy of the thorax in a simple and clear style.

In the second chapter he deals with inspection and in this connexion Corrigan is aptly quoted: "The trouble with most doctors is not that they don't know enough, but that they don't see enough." The author lays stress on the importance of a careful general inspection in addition to the local inspection.

The chapter on palpation comes next and that part dealing with normal and abnormal vocal fremitus is particularly good.

In the chapter on percussion interesting historical notes reveal the fact that this method of examination was first practised by the ancient Greeks. The author discusses the merits of light as opposed to deep percussion. He favours light percussion for most purposes and with this most clinicians will be inclined to agree. He also mentions the modern ortho-percussion of Goldschieder and Curshmann, but is rather non-committal as to its value. In regard to signs associated with conditions that give absolute dulness he describes and illustrates well Grocco's and Garland's triangles and shows very clearly their significance. The value of percussion of the upper six dorsal spines is emphasized, as the significance of abnormal dulness in this area is well explained.

Auscultation comes next. Here we are told about the discovery of the stethoscope by Laennec; as with many other happenings in this world, a woman appears to have been directly responsible! The author favours the monaural stethoscope for most purposes, but recognizes that the binaural instrument is indispensable in dealing with children and patients who are in bed. Most experienced clinicians will probably agree with his deprecation of the use of modifications of the stethoscope, such as the phonendoscope *et cetera*.

In regard to the auscultatory signs of cavity formation in the lungs, the author lays emphasis on the possibility of their variations from day to day; he thinks that this may be due to the cavities filling up or becoming empty of secretion. Not only students, but many practitioners, have been puzzled by this point and sufficient stress has been scarcely laid upon it by other teachers.

The next chapter deals with the use of the X-rays in diagnosis. Here the author expresses regret that physicians as a rule relegate the interpretation of skiagrams to the radiographer and as a result fail to acquire that facility which gives the X-rays an enhanced value as a diagnostic agent. This chapter is full of most instructive and clear reproductions of skiagrams and these alone make the book worth buying.

A chapter on tuberculosis of the larynx is well in keeping with the rest of the book, both in regard to the description of the normal and morbid anatomy and the accompanying illustrations. The author concludes with remarks on the classification of tuberculosis and with a description of graphic signs that should be useful to many.

The book can be enthusiastically recommended alike to teachers of medicine, general practitioners and advanced students.

WAR BLINDNESS.

SIR ARNOLD LAWSON'S intertesting little book on "War Blindness at St. Dunstan's"[1] is dedicated to the founder of that institution, the late Sir Arthur Pearson, whose wonderful courage and victory over blindness will ever be an example to those similarly afflicted. Sir Arnold Lawson and Major Ormond shared the work at St. Dunstan's during the war and up to eighteen months after the armistice they had under their care 1,833 patients affected by blindness caused directly or indirectly by the war. Blindness in over 26% of this number was due to disease, syphilis being mainly responsible. It is remarkable to note that not a single commissioned officer was admitted to the hospital suffering from blindness caused by disease.

The author has classified and has given detailed descriptions of the eight hundred and twenty-five patients admitted to hospital under his care.

Fractures of the skull naturally accounted for the majority of the four hundred and seven instances caused by trauma. There were sixteen instances of concussion blindness without direct wound or penetration of the globe. One instance of this nature is quoted as being possibly the most extraordinary of the war. A soldier at Gallipoli was knocked down and rendered unconscious by a shell-burst quite close to him. There was no direct wound, but both eyes were blown in and completely destroyed. The few instances of sympathetic inflammation occurred after some operative interference; none occurred after smashing of one eye by splinters or bullet wound.

Of the four hundred and seventeen instances not caused by trauma, one hundred and nine were caused by primary optic atrophy. Eighty were certainly due to syphilis. The author states that he has never seen optic atrophy improved by injection of arsenic compounds; on the contrary, the condition of some patients deteriorated rapidly after a course of injections. Gordon Holmes, who has also had an opportunity of seeing many such instances, came to the same conclusion.

As the result of a careful study of the causes of blindness apart from trauma the author has made some very important observations which must greatly influence future methods of examination of recruits for the services. He considers it inadvisable to accept any man whose defective sight in both eyes is due to old inflammatory disease of the uveal tract. If one eye is defective owing to uveal inflammation and the other is quite sound, the candidate should not be accepted. An ophthalmoscopic examination of every candidate or recruit would have revealed such conditions as *retinitis pigmentosa*, chronic chorioido-retinitis *et cetera* and many thousands of pounds sterling would have been saved in disability pensions. The latter, of course, is a counsel of perfection.

The last chapter, on the re-education of the blinded soldier, is a wonderful record of the untiring patience and devotion on the part of all connected with St. Dunstan's. The reader of this book cannot but be filled with admiration for the results that have been achieved.

[1] "War Blindness at St. Dunstan's," by Sir Arnold Lawson, K.B.E., M.D., F.R.C.S., L.R.C.P.; 1922. London: Henry Frowde and Hodder & Stoughton; Melbourne: Oxford University Press (E. R. Bartholomew); Demy 8vo., pp. vii. + 148 Price: 7s. 6d. net.

Notes on Books.

THE GUARDIAN ASSURANCE COMPANY, LIMITED.

The directors of the Guardian Assurance Company, Limited, with natural pride and a recognition of the importance of self-assertion, have published an interesting volume to commemorate the centenary of their great organization.[1] The book is well planned and elegantly produced. Some of the illustrations are works of art. Its contents may be regarded as a record of the undertakings of a century of a house that has earned a large reputation. In the first chapter there is an admirable *résumé* of the political situation in 1820 which is contrasted with the situation in 1920. The theme gains in human interest on account of the similarity between the aftermath of the Napoleonic wars and that of our own world conflagration. The directors of the company which was born during the former period, use the circumstance to draw a second comparison—that of their early efforts and their present achievements. The other chapters are devoted more directly to the policy of the board of directors and the ostensible success of that policy. It makes good reading and at the same time inspires confidence in this well-known life insurance society. The epilogue, a recommendation to the public to trust those who have not failed them in the past, closes the descriptive letterpress. The Roll of Honour takes precedence over the other lists. It is a long and glorious one and is a credit to any private organization.

[1] "A Record of the Guardian Assurance Company, Limited," compiled by A. W. Tarn and C. E. Byles, with an introduction by the Chairman; 1921. London: Blades, East & Blades, Limited; Royal 8vo., pages 153, with illustrations and tables. Printed for private circulation.

The Medical Journal of Australia

SATURDAY, JUNE 2, 1923.

The Safety of Australia.

IN a speech delivered at Perth the Prime Minister recently made a significant reference to an alarming possibility. While he admitted that the eventuality was almost inconceivable, the fact that he found it expedient to discuss this possibility must be regarded by every thinking person as an indication that the future may contain stupendous difficulties for the Commonwealth. The Prime Minister pointed out that no one could foretell what might happen in Imperial politics; that at a later date a change might be effected in the government of the Empire and that a new government might withdraw from the overseas dominions that protection which the Royal Navy has in the past accorded them. The problem of Australia having to depend on her own unaided resources to protect her shores and her population against invasion must appear to statesmen as one of appalling difficulty. It might even be a task impossible of fulfilment. The financial aspect would tax the ingenuity of any Treasurer, no matter how experienced. The Prime Minister intimated that in such a state of affairs, all developmental expenditure would have to cease. Every penny would be required for defence purposes and it is certain that the attempt would be accompanied by financial stringency. This journal is not concerned with the question of whether the task could be carried out or not. But it is concerned with one aspect of the problem, namely, the enhancement of effectiveness of the fighting forces from the point of view of man power. History records that even numerically weak nations have achieved wonders in the military and naval sense by the maintenance of a high degree of efficiency. The unequalled courage and stability of the Australian have received world-wide recognition in the Great War. But the fact has to be faced that the percentage of inefficiency among our males of fighting age was appallingly high. The wastage of war has reduced the man power of Australia to a considerable extent and this wastage cannot be made good within one generation, perhaps two. It is therefore obvious that the medical profession has two great functions to perform to render this great, sparsely populated continent safe in the face of the eventuality of which the Prime Minister has spoken. These two functions are equally important and equally intricate. They are both costly. The one entails an economic improvement of the condition of the people under all circumstances; the other involves expenditure that yields no return until and unless Australia is directly threatened from without. This journal is constantly referring to one or other aspect of the first problem, the general improvement of the community health, the elimination of disease, the prevention of infantile and maternal mortality, the maintenance of a high standard of physical efficiency of the civil population.

The second problem demands the immediate and thoughtful consideration of the medical profession and of the Federal Parliament. The strength of the nation depends essentially on the medical arrangements of the defence forces. No war is possible today without a properly equipped medical service, for military and naval authorities demand a selected population to comprise their forces. The experience of the war is highly significant. If the world is to be embroiled in another sanguinary conflict and if Australia is to be a participant, the selection of the fighting men must be carried out much more effectively than it was carried out during the four years of the war. This work of examining recruits has to be done by the rank and file of the medical profession and it is not to be undertaken lightly. The system of the medical boards must be revised and each medical officer entrusted with this task must regard it as a mark of honour that he is permitted to render this important service to his nation. The defects and shortcomings revealed in the recent war are still fresh in the memory of everyone. To allow this incomparably valuable experience to be lost would be nothing short of criminal. Moreover, it should not be forgotten that memory is remarkably short and that the middle-aged, efficient man of today is the antiquated, obsolete individual of a few years hence, unless he be kept in constant activity

and unless he be offered facilities for maintaining his alertness. At present our Australian Army Medical Corps is decadent and dwindling. On paper its machinery is better than in fact. There is a handful of competent, energetic and willing helpers. Soon these men may lose heart, as the service becomes more and more starved. Later, when the remnant of the Corps approaches emaciation, there may be none with actual experienec to set it on foot again, should an emergency arise. The same story obtains in regard to every branch of the Army Medical Service. Not even the self-reliance and ingenuity of the medical practitioner of the Commonwealth will avail, if the present service be allowed to languish and lapse into nothingness.

The Naval Medical Service is suffering in a similar manner. This service has not enjoyed popularity in the past. The causes have been varied and curious, but they have been very real. To-day we detect a strange tendency to perpetuate a feeling that has long existed in medical circles that the naval medical officer does not enjoy a fair deal. Instead of encouragement and an inspiration of confidence the naval authorities offer cast-iron rules and repeated invitations for new men. Meanwhile, the Royal Australian Navy is being reduced in size and strength at an alarming speed. Costly as the maintenance of a powerful navy may be, the polity of reduction at a rate greater than that dictated by the world's interpretation of the Washington agreement must be questioned by the economist as well as by the statesman. If the Prime Minister's eventuality came to pass, what would Australia's position be with a mere wraith of a navy? But these are political matters. The point at issue is the medical service of the navy. It might be argued that with a starving and dwindling navy, the maintenance of a naval medical service would be futile and unnecessary. It would certainly be impracticable to endeavour to keep the service efficient under these circumstances, unless a special expedient were adopted. The naval medical officer is primarily a medical practitioner, trained to adapt his professional knowledge and skill to conditions of maritime warfare. Discipline, knowledge of the inexorable rules of the service, ability to perform professional services under uncomfortable and at times tantalizingly unsuitable conditions and, above all, a "naval temperament" are the chief equipment of the naval medical officer. Some of these qualities can be exercised and developed away from ships and away from the sea. Moreover, many of the qualities named are common to the Naval and the Army Medical Services. The proposal put forward by certain medical practitioners who served with distinction during the war, that the medical services of the three branches of the defence forces should be amalgamated, would consequently meet the difficulty of the disappearing navy.

The Air Force, the baby of the age, stands in a different light. There is the fact that aeronautics sprang into being during the last quarter of a century, that the daring of the intrepid pioneers of the early years of this century rendered the extraordinary effectiveness of the aeroplane and airship as an engine of war possible at a very early stage. This branch of the defence service has as yet few traditions. It lives in the present and the immediate past and it will develope *pari passu* with the progress in civil aeronautics. In Australia civil flying needs guidance and a master hand to force it into favour. The periodic air trips from Perth to Broome should compel the attention of all dwellers in this continent of vast empty spaces. Speeches have been delivered and newspapers have echoed, feebly it is true, the words of the few keen airmen, advocating a rapid and wide adaptation of flying to commercial and social purposes. Still there is no direct airship or aeroplane service from Sydney to Perth or from Adelaide to Brisbane. Again the essential disciplinary, adaptive basis encountered in defence service is wanting. It will be remembered that the function of the air force medical officer, like that of the medical officer of the other two branches, is to select suitable men for service and to watch and guard them so that they may remain efficient. By amalgamating the medical services this function could be effectively performed by a sufficiently large number of trained medical officers to render signal service to civil aviation, while the preparedness for warfare would be lasting and reliable. This combined service would be economical, practicable and sound. It would be the means of saving the situation. The dying Army Medical Corps would be nur-

tured and nursed back to animation; the Naval Medical Service would be re-established in the confidence of the medical profession and the youngest of the medical services would find its feet. There is still time to launch the scheme with a large prospect of success. Delay may make all the difference, for those whose invaluable experience was gained during the Great War and who are capable of guiding the service, are still with us. The medical profession might in this way prepare for the eventuality mentioned by the Prime Minister and change an apparently hopeless task into one full of promise.

Current Comment.

X-RAYS AND INFLAMED TISSUE.

RADIOLOGISTS during the past twenty years have concentrated their attention largely on their apparatus and on the general results of the application of varying doses of Röntgen rays. Very little work has been carried out with a view of ascertaining the exact nature of the changes inflicted on normal and abnormal tissue cells in the living body. In a recent issue Dr. Herman Lawrence has endeavoured to trace the general effect of radium rays and especially of γ rays on lower forms of animal life. His observations have been based to a great extent on the interference exercised by the rays on the development of the fertilized ovum of silkworms, but he has apparently been satisfied in observing gross defects of function and has not concerned himself with the underlying histological changes in the egg cell. It has long been known that exposure of the sexual glands to Röntgen rays results in the killing of both ova and sperms. The somatic cells of the testes and ovaries resist doses sufficient to kill spermatozoa and ova. It has been assumed that of the blood cells the lymphocytes, being indifferent, non-granulated cells of the lymphoid system, are in consequence specially sensitive to X-rays. In addition, studies have been undertaken for the purpose of ascertaining the relative sensitiveness of the several component cells of every organ and tissue of the body. All these studies, however, have been carried out on broad lines; little attempt has been made to follow the bio-chemical changes resulting from sub-lethal irradiation. It may, therefore, be said that at the present time the exact action of Röntgen rays in producing histological and chemical changes in normal cells has not been determined.

Some promising and suggestive work along these lines has been attempted by Dr. Alexander A. Maximow, although he has limited his investigations to the question of inflammation and the histological changes induced by X-rays on inflamed tissue cells. He has apparently not attacked the more difficult, but probably more important problem of the biochemical changes. In a recent publication he gives a full account of experiments with inflamed connective tissue cells.[1] The work is fully illustrated, so that the reader has no difficulty in following the arguments used and in verifying the data on which Dr. Maximow's conclusions are based. This study, as he points out, is of the utmost importance, since loose connective tissue is distributed all over the body and is frequently in a state of inflammation. The inflammation was established by introducing flat, rectangular celloidin blocks with slits cut parallel to the surface into the subcutaneous or intermuscular connective tissue of the abdominal wall. The animals used were rabbits. The abdomen was protected save in an area corresponding to the celloidin block by means of a lead sheet of three millimetres thickness. The rays were filtered through 0.5 millimetre of aluminium. The tubes were situated at a distance of fourteen or fifteen centimetres from the skin and about twelve Kienboeck's quantimetric units were regarded as the standard unit for treatment. This standard unit was arbitrarily called x. The exposures were carried out each day for a period of fifteen minutes. The number of exposures varied in the several animals from one to fifteen. The animals were kept alive for a period varying between five and sixty days. At the end of this time the animals were killed and the exposed part of the abdominal wall removed and prepared for microscopical examination.

Before the study could be properly initiated it was necessary to set up regular controls, so that the normal histological changes occurring in this form of aseptic inflammation could be standardized. In all control sections it was found that the local sessile elements, the fibroblasts and resting wandering cells, were the seats of the most important changes, while the wandering elements, the special leucocytes, the lymphocytes and the polyblasts revealed less extensive changes. In one specimen affected with inflammation of thirteen days' duration the fibroblasts were considerably increased in number and constituted practically a new tissue layer. Their bodies contained regular oval nuclei with dust-like chromatin granules and typical large nucleoli. Between the cell bodies were newly formed, thin, densely placed collagenous fibres. There were further isolated polyblasts scattered between the fibroblasts. Toward the surface of the celloidin block was a thin layer of multinucleated syncytium-like giant cells, lymphocytes, phagocytic polyblasts of varying size, granular special leucocytes and necrotic cell remains, chiefly derived from special leucocytes. Invading the blocks fibroblasts and phagocytic polyblasts in different stages of development were noted.

Contrasted with this was tissue that had been exposed and had been fixed eleven days after the second exposure. There was no newly formed layer of connective tissue. The block was surrounded by a loose net-like structure looking like clotted fibrin. Within this exudate were scattered special leucocytes, varying from the smallest lymphocyte-like cell to the large macrophage. Some of the polyblasts had branched pseudopodia. While degenerated polyblasts were rare, degenerated special leu-

[1] *The Journal of Experimental Medicine*, March 1, 1923.

cocytes were quite common. On the surface of the blocks were dense masses of small lymphocyte-like cells and large phagocytic polyblasts and great numbers of special granular leucocytes. The collagenous fibres were swollen and the spaces between them were filled with clear liquid containing fibrin network. The fibroblasts in this situation were widely separated. Mitotic figures were not seen within them. The cell bodies were thickened and enlarged and showed either polygonal or fusiform shapes with long, tapering ends. The protoplasm was strongly basophilic and the nucleus was enlarged; the granules were coarser and the nucleoli were larger than in the control preparations. Signs of fragmentation were seen in many of the nuclei.

Similar but more intense changes were found in the tissue exposed to more intense doses of Röntgen rays. It thus appears that while the fibroblasts of inflamed tissue normally divide mitotically within the first twenty-four hours and form a layer of new connective tissue, they remain idle after irradiation and either do not multiply at all or undergo abnormal division. Amitotic constrictions are often seen in the nuclei. Collagen formation apparently does not occur in irradiated tissue. The author points out that no distinctive changes could be found in the leucocytes or polyblasts. He is also inclined to the opinion that the transformation of the polyblasts into fixed resting forms seems to be delayed. Even in the late stages the tissue is overcrowded with granular special leucocytes and with lymphocyte-like polyblasts. He is not prepared to hazard a guess as to what the ultimate result of the changes would be. The longest period of observation after the last exposure was sixty days.

The author himself is surprised at the result of this invsetigation. Fibroblasts are held to be the most highly differentiated element involved in inflammation. The usual idea is that not they, but the lymphocytes, would be the first influenced by Röntgen rays. He therefore approaches the further question of the action on lymphocytes and polyblasts with some caution. Notwithstanding the fact that signs of degeneration were not noted, he admits that it is possible that emigrated lymphocytes might be destroyed within the first twenty-four to forty-eight hours of the exposures and their remains quickly removed. This explosive action has been described in lymphatic glands and in the thymus and also in the skin affected with *mycosis fungoides*. Before a definite conclusion could be formed, it would be necessary to examine specimens from one to three days after the last exposure. He mentions one fact that renders this suggested phenomenon improbable. In his specimens the resting wandering cells do not appear to be affected by the rays and these cells are undoubtedly closely related to lymphocytes. He further refers to the experiments of Hertwig and others which prove that the chromatin of the nucleus is the most sensitive tissue to X-rays. The nuclei of the hypertrophied fibroblasts attain a considerable size and contain much chromatin. At times they become valuolated. They are obviously paralysed and incapable of mitosis. Dr. Maximow suggests that this may be the reason why the fibroblasts are affected by the rays in inflammation, for the lymphocytes and polyblasts rarely divide in the field of inflammation. These observations are obviously of considerable importance. If studies of this kind could be correlated with bio-chemical studies, some of the points still at issue would probably be cleared up.

HYDROCEPHALUS.

If any evidence were needed of the unsatisfactory nature of the results obtained in the treatment of hydrocephalus a glance at the variety of surgical procedures that have been undertaken with a view to giving the unfortunate patient some relief, would suffice. Most of these methods of treatment were aimed at relief of the collection of cerebro-spinal fluid and not at the cause of its retention. Thus the simplest method was that used by Kausch in repeated puncture of the ventricles of the brain. Pollock and Keen first tried to establish permanent drainage from the ventricles and Mikulicz attempted to drain the ventricles into the subcutaneous tissues of the scalp by means of a tube. Other workers tried to establish drainage by using various kinds of tubes, silk strands and so forth. The results of all these, however, were unsatisfactory. Other surgeons sought to establish drainage into the sub-arachnoid space. Von Bramann in Germany obtained some successful results by means of puncturing the *corpus callosum*. Pussep reported improvement in some patients by means of combined sub-arachnoid and subcutaneous drainage. One patient among ten whom he operated on, died and several showed improvement. Quincke suggested more complicated methods by draining the cerebro-spinal fluid from the spinal canal into the peritoneal cavity. This method of treatment presupposes a free circulation of cerebro-spinal fluid from the ventricles to the sub-arachnoid space. Such a variety of hydrocephalus is unusual. Cushing trephined the fifth lumbar vertebra and drained the fluid into the retro-peritoneal space. Other surgeons tried to establish drainage into the venous sinuses of the skull. The results were not satisfactory.

It was not until Dandy investigated the question anatomically and experimentally that it became possible to recognize the several types of hydrocephalus. With recognition of the types of the disease it has been possible to undertake treatment suitable to each variety. Dandy proved experimentally that the cerebro-spinal fluid is produced from the chorioid plexus and that absorption takes place in the sub-arachnoid space. Absorption in the sub-arachnoid space takes place mainly through the blood vessels of the arachnoid villi. Normally there is a balance between secretion and absorption. The course of the cerebro-spinal fluid is well defined. After secretion from the chorioid plexus it passes from one ventricle to the other by means of the foramen of Munro. By the aqueduct of Sylvius it passes backwards into the fourth ventricle. From the fourth ventricle it passes into the sub-arachnoid space by means of the foramina of Luschka and the foramen of Majendie.

According to the classification adopted by Dandy hydrocephalus may be divided into two groups, internal and external hydrocephalus. The type of hydrocephalus described by him as external is of very rare occurrence. In this variety the ventricles are empty and the fluid accumulates outside the brain. It is generally associated with cerebral malformations and is incompatible with life. Internal hydrocephalus, as described by Dandy, consists of two varieties. The first variety, to which he applied the term obstructive, is characterized by the presence of an obstruction at some point in the ventricular system. The onward flow of the cerebro-spinal fluid is arrested and distension of the ventricles occurs. The second variety he described as communicating hydrocephalus. He claimed that it was caused by interference with the absorption of cerebro-spinal fluid in the sub-arachnoid space and was generally the result of adhesions in this position. It is characterized by an accumulation of fluid, both in the sub-arachnoid space and in the ventricular system.

The subject of hydrocephalus has recently been studied in a complete and scientific manner by Dr. John Fraser and Dr. Norman M. Dott.[1] The classification adopted by these observers differs from that of Dandy in nomenclature. They have not considered types of hydrocephalus which do not call for surgical interference. They state that the term communicating, as used by Dandy, is not sufficiently expressive of the condition and may even be misleading. To this type of the disease they have applied the term extra-ventricular. To the type described by Dandy as obstructive they have applied the term ventricular. They point out that ventricular hydrocephalus may be due to cerebral tumours. It may be the result of birth hæmorrhages or of infective meningeal conditions, while syphilis may be the underlying cause. In regard to the causation of the extra-ventricular type, they regard their observations as confirmatory of Dandy's assertion that it is due to adhesions in the sub-arachnoid space.

Drs. Fraser and Dott have investigated twenty-one instances of hydrocephalus. Six of these were of the extra-ventricular type and fifteen of the ventricular type. Of the latter group the obstruction in seven instances occurred between the third and fourth ventricles and in eight in the roof of the fourth ventricle. In the diagnosis some difficulty may be experienced in determining the type of the condition. Several procedures are of assistance. Lumbar puncture may be useful, while Drs. Fraser and Dott found that the injection of phenol-sulphone-phthalein into the ventricle as recommended by Dandy was of considerable help when the cerebro-spinal fluid was subsequently examined. Useful information was obtained by examining the urine after injecting phenol-sulphone-phthalein into the ventricle, in view of the fact that this colouring matter is easily absorbable from the sub-arachnoid space, but not from the ventricles. Lastly, ventriculography after the introduction of air into the ventricles may be the means of determining the site of the obstruction in the ventricular type.

In regard to treatment, Drs. Fraser and Dott lay great stress on the fact that this must be undertaken early, before accumulation of cerebro-spinal fluid has caused extensive destruction of white matter. In the ventricular type of the condition they have undertaken an extensive surgical operation for the relief of the obstruction in several instances. It is not necessary to describe this in detail. Of ten children on whom they operated, two are reported as cured. In one child the condition was arrested and "probably cured." Two were improved and the rest died. In the treatment of children suffering from the extra-ventricular type, ligature of the carotid arteries was carried out. Five children were operated on. One died within forty-eight hours of the operation and in one the results was quite unsatisfactory. In the three remaining children the disease has apparently been arrested.

The results of this work of Drs. Fraser and Dott are interesting in that they illustrate the importance of combining pathological study with surgical technique. The practitioner who would practice surgery without having an intimate knowledge of surgical pathology, will be merely an operator and not a surgeon. In regard to the condition of hydrocephalus itself, the number of successful results is not large, but investigation along the lines first laid down by Dandy and now carried on by Fraser and Dott will offer some chance of relief in a condition which otherwise must be regarded as hopeless.

[1] *The British Journal of Surgery*, October, 1922.

MEDICAL CERTIFICATES.

IN the leading article on "Medical Certificates," published in THE MEDICAL JOURNAL OF AUSTRALIA of May 5, 1923, the following statement appears: "Consent will not be necessary in criminal jurisdiction, if it is necessary to investigate the bodily condition of an accused or suspected person. In criminal investigation the police authorize an examination." Our attention has been directed to certain cases in which this point has been raised in courts of law. It appears that there is no statutory authority enabling a magistrate or the police to order a medical practitioner to examine a person either charged with an offence or after conviction. Nevertheless, magistrates have on occasions issued orders to medical practitioners and the medical practitioners have carried out the examinations without the consent of the persons concerned. The court has held in these instances that an assault has been committed and the medical practitioner has been fined. Mere submission to the examination is not sufficient; there must be expressed consent. Medical practitioners expose themselves to the risk of prosecution if they obey an order of a magistrate or of the police to examine a person against his or her will. If such an examination is carried out, the medical practitioner should previously obtain the consent, preferably in writing, of the person to be examined.

Abstracts from Current Medical Literature.

PHYSIOLOGY.

Atmospheric Cooling Power, Pulse Rate and Muscular Efficiency.

LEONARD HILL AND J. A. CAMPBELL (*Journal of Physiology*, October, 1922) have made observations on the effect of different degrees of atmospheric cooling power on the pulse rate and efficiency in muscular exercise. The exercise was performed on a bicycle ergometer by a trained subject and the experiments lasted fifteen minutes. The atmospheric cooling power was measured by Hill's katathermometer. It was found that the cooling power had no effect on the efficiency. Thus in one experiment under a cooling power of five millicalories per square centimetre per second and working five hundred and seven kilogrammetres per minutes, the gross efficiency was 16.1 and the net efficiency 19.3, whilst in another experiment, under a cooling power of 10.8 (twice as cool) and working five hundred and fifteen kilogrammetres per minute, practically the same figures were found for the efficiencies, namely, 16.9 and 20 respectively. On the other hand, the pulse rate was quite different in these two experiments, being 156 under a cooling power of 5 and 120 under the cooling power of 10.8. Apparently, then, in these short experiments, the cooler conditions greatly relieved the heart, although the efficiency of muscular contraction was not affected. This is an indication of the value of cool conditions during work, for fatigue of the heart will shorten the working period of men in warm surroundings and thus lower the total working efficiency of the day.

Muscle Tone and the Sympathetic.

IT has been asserted by some observers that tone in muscle is related to the sympathetic nervous system. K. UYENO (*Journal of Physiology*, October, 1922) has investigated the possible relation from a new aspect. Stimulation of the sympathetic has not been found to cause increase of tone in other conditions, but apparently it has not been tried in decerebrate rigidity. In view of this and of the possibility that vaso-constriction might influence the tone, the effect of stimulating the stellate ganglion and of applying nicotine to it has been tried. The ganglion was exposed from the back and the sympathetic tied below it and cut. The branches to the heart were also cut. On stimulating the ganglion, not the slightest change in the rigidity of the forelimb on the stimulated side could be detected. In the case of nicotine the ganglion was exposed on the two sides and the sympathetic trunk left intact, the heart branches were tied and cut on one side and nicotine painted on both surfaces of the ganglion. No change in rigidity was noticed. The ganglion was then extirpated; the comparative rigidity of the two sides was unaltered and remained the same for several hours.

Basal Metabolism.

HENRI JANET (*Journal de Physiologie et de Pathologie Générale*, Volume XX., No. 3, 1922) gives some very useful tables and graphs for the rapid calculation of the basal metabolism. On the basis of Du Bois's formula for the surface of the body in relation to the height and weight he has drawn a graph from which by the simple application of a ruler the surface of the body in square metres can be obtained, given the height in metres and the weight in kilograms. From another graph, used in the same manner, the figure for the basal metabolism in calories per hour per square metre of surface can be obtained directly from the figures for the surface area and the oxygen consumed per hour. In the construction of this last graph the calorific value of oxygen has been taken as 4.83, which corresponds to a respiratory quotient of 0.82. He also gives a table for determining the true respiratory quotient from the apparent respiratory quotient and takes into account the fact that the percentage of nitrogen in the expired air is slightly greater than in the inspired air. A complete example is worked out to show the use of the tables and graphs.

Sodium Bicarbonate and Intestinal Movements.

C. E. KING AND J. G. CHURCH (*American Journal of Physiology*, November, 1922) have investigated the effect of intravenous injections of sodium bicarbonate on the intestinal movements of the dog. The work was done on the small intestine of intact animals under ether and after decerebration and with isolated strips suspended in oxygenated saline solution. The most constant effect observed and recorded was an increase in tonus. Next in prominence was an increase in amplitude and finally an increase in rate. The increase in rate was not constant. The reaction lasted for some minutes. In many instances the tonus of the intestine remained higher than before the injection for more than an hour and in some instances rhythmical movement persisted during this whole time. The reactivity to repeated injections of bicarbonate gradually diminished, the tonus reaction being the last to disappear. The intensity of the reaction runs somewhat parallel with the amount of bicarbonate injected. It was shown that the action is peripheral and that in the main it lies beyond the terminations of the vagus nerve, also beyond the ganglion cells of the enteric system. Bicarbonate of soda stimulates both the outer and the mucosal musculature of the intestine. The experimental dosage was within the limits of those usually employed by clinicians in acidosis. If the reaction in the human being under the conditions of its administration is similar to that in the animals experimented on, it is obvious that in some instances it may do considerable harm. It might be wise to hesitate to use it in a patient whose intestine has recently been sutured, in a patient in whom there is danger of rupture from other causes and in a patient with localized peritonitis.

Hæmorrhage and Blood Volume.

W. M. BAYLISS (*Journal of Physiology*, October, 1922) has investigated the limit of the hæmoglobin concentration below which the tissues must suffer from want of oxygen when an artificial fluid, such as gum-saline, is used to replace lost blood. In a series of experiments on anæsthetized cats it was found that, provided not more than 70% of the calculated blood volume was removed, it could be effectively replaced by gum-saline, so far as absence of any sign of respiratory or other failure was concerned, whereas a loss of anything over 30% was always fatal in the course of two or three hours if not replaced. If more was removed the animals did not survive more than three hours, even if the volume was made up by gum-saline or glucose-plasma. In some of the experiments the dilution of blood was determined. Cats with 14.6% and 12.9% of the normal hæmoglobin showed no signs of failure. Those with 10.7%, 9.45% and 6.1% died in the course of two hours or less. It is surprising that the normal percentage of hæmoglobin is so much in excess of that required for supply of oxygen at rest, so that, provided the normal blood volume is kept up, a hæmorrhage amounting to three or four litres in man can be replaced by gum-saline. The explanation of the importance of the volume lies in the experiments of Gesell, who found that the dilution was far more than compensated by the increased irrigation or "nutrient flow."

BIOLOGICAL CHEMISTRY.

Ammonia in Blood in Nephritis.

D. S. RUSSELL (*Biochemical Journal*, January, 1923) has made some estimations of the amount of ammonia in the blood of persons suffering from severe forms of nephritis. The measurements have been performed by the aeration method of Folin and Denis. Suitable controls have shown the adequacy of the method and the purity of the reagents in respect to ammonia. In addition, estimations have been made of the percentage of urea in the blood, hydrogen ion concentration of the blood, plasma bicarbonate of Cullen and Van Slyke, together with suitable determinations on the urine. Seventeen persons have been examined, in all of whom there was definite retention of urea as shown by the figure for urea in the blood. A series of eleven estimations have been made on persons without signs of disease of the kidneys. The results show values under 0.1 milligramme per 100 cubic centimetres and reveal no differences between the figures of the two series. There is thus no evidence of the retention of preformed ammonia similar

to that of the retention of urea. The author considers that her results support the view of Nash and Benedict that the kidneys are the site of the formation of ammonia and that the traces of ammonia found in the blood of the systematic circulation represent an overflow from the kidneys.

Zymolysis of Urea.

W. R. FEARON (*Biochemical Journal*, January, 1923) has made a study of the chemical changes involved in the zymolysis of urea. It has long been known that the alkaline fermentation of urine exposed to the air is due to the conversion of urea into ammonia. This change may be brought about by organisms or by enzymes separated from them. More recently the discovery of the enzyme urease in soy-bean has given an impetus to the study of this reaction. Although some discussion of the nature of the reaction has occurred, most persons have accepted the equation of Dumas representing urea and water forming ammonium carbonate. Rather more than twenty years ago C. E. Fawsitt proved that the hydrolysis of urea by acids, alkalies and hot water proceeds on different lines, urea giving rise to ammonium cyanate and ammonium cyanate undergoing hydrolysis to ammonium carbonate. Further research has shown that the "hydrolysis" of urea occurs in two stages, firstly the dissociation of the urea molecule into ammonia and free cyanic acid and, secondly, the hydrolysis of cyanic acid by the solvent. The author has made a careful study of the urea-urease system in the light of this knowledge of the chemical decomposition of urea. Cyanic acid has been isolated as the silver salt from solutions of urea undergoing decomposition by urease. Cyanic acid attains a maximal concentration so that it is continually produced as fast as it is removed by hydrolysis. Cyanic acid and ammonia form the intermediate products of the decomposition of urea by urease. Urease is a dissociating enzyme which splits the neutral urea molecule into an alkaline component, ammonia, and an acid component, cyanic acid. Cyanic acid is rapidly hydrolyzed into ammonia and carbon dioxide. The reactions are in accord with the formula for urea suggested by Werner and not in accord with the older view that urea is carbamide. It thus appears that the zymolysis of urea proceeds along the same lines as the decomposition of urea in solution by acids, alkalies and heat.

Hydrogen Ion Concentration.

J. F. MCCLENDON (*Journal of Biological Chemistry*, November, 1922) has prepared a useful chart by means of which colorimetric readings with different indicators can be readily converted into concentrations of hydrogen ion. The chart is designed so that the figure for the hydrogen ion concentration can be obtained at once from the percentage of indicator associated as determined in the usual way. This figure may be obtained by calculation and the use of a formula, but the author remarks that, although such calculations are done easily by many workers, they are only accomplished with difficulty by others and the liability for error is often proportional to the difficulty. Graphs have been prepared by Clark and others to show the relation of concentration of hydrogen ion to percentage of dissociation of the indicator. These graphs have been curves which are not easily drawn by many persons, so that it seems to the author desirable to change the graph paper in such a way that the curves become straight lines. This cannot be done with ordinary graph paper, as different regions of the graph must have different numerical values if the graph is to be a straight line. The author has prepared a graph on this principle. Such a graph has an advantage over the usual curves in the ease with which a new indicator can be added. When the dissociation constant is known, a straight line covering the range is drawn across the graph for the new indicator. With a solution of unknown concentration of hydrogen ion, a determination is made as follows: Phenolphthalein, for instance, is added to an unknown solution coming within its range. The solution is placed in the left hand cup of a colorimeter and the same amount of indicator in an alkaline solution in the right hand cup. The reading of the left hand cup is set at ten and the cups are matched. The reading for the right hand cup is the percentage of indicator dissociated in the unknown solution. The same principle is used with thymolphthalein and other related indicators in mapping out the range of acid and alkaline values.

Tethelin.

T. B. ROBERTSON (*Biochemical Journal*, January, 1923) replies to the account of the experiments of Drummond and Cannon and their criticism of the conclusions that anterior lobe of pituitary gland contains a substance "Tethelin" controlling the growth of animals. The author ascribes the failure of Drummond and Cannon to isolate "Tethelin" from alcoholic extracts of pituitary tissue to their use of carbon dioxide as a protection against oxidation. He had noted that carbon dioxide caused a darkening of "Tethelin" and suggests that the faint acidity leads to destruction upon heating solutions of "Tethelin." The author then proceeds to review the evidence in respect to the action of "Tethelin" upon growth. He states that the only evidence of a quantitative character is that derived from the data of the growth of ten animals of each sex during a period of administration which extended over nine weeks. The author suggests that the reason for the failure of Drummond and Cannon is due to the fact that they employed dried anterior lobe tissue in their feeding experiments while others have employed fresh tissue. Finally, the author contends that the statistical method of comparing the growth of normal animals with that of animals in receipt of dietary additions must of necessity be superior to the haphazard method of comparing individual growth-curves or curves constructed from the growth of a few animals.

Sterol in Cow's Milk.

F. W. FOX AND J. A. GARDNER (*Biochemical Journal*, January, 1923) have made a study of the sterol content of cow's milk. Ordinary cow's milk contains nearly 0.1% of a mixture of substances which can be extracted with ether or light petroleum after saponification of the fat by alkalies. The authors have made a quantitative determination of the cholesterin content of fresh and condensed milks, a qualitative examination of the fraction of sterols precipitable by digitonin and a separation of the residual non-precipitable oils. The analyses have been made on the fat separated in the Gottlieb-Rose method. The authors estimated the free cholesterol, ester cholesterol and total cholesterols. The results show that the cholesterol content varies roughly with the fat content. There appears to be no effect due to breed, diet or period of lactation. The authors found most of the cholesterol to be free. As to the form in which cholesterol occurs in milk the authors note that skimmed milk contains much more cholesterol than would be expected from its fat content. They conclude that the cholesterol is not entirely present in the fat globules. Qualitative analysis of the sterols shows that the precipitable portion of the unsaponifiable matter of milk fat consists entirely of cholesterol. From the oils not precipitated by digitonin the authors did not succeed in isolating any pure substance.

Estimation of Sugar in Blood.

E. G. B. CALVERT (*Biochemical Journal*, November, 1922) describes a new method for estimating the amount of reducing substance or glucose in blood. The author bases his method on those of Folin and Wu and of Mackenzie, Wallis and Gallagher. The blood is collected and weighed in a special platinum crucible which the author notes remains constant in weight and that thus numerous weighings are avoided. The capsule is dropped into a wide tube containing water into which the blood diffuses on shaking. After laking has occurred, proteins are precipitated by tungstic acid. The fluid is made to constant volume before filtration. The estimation of glucose depends on the reduction of alkaline solution of copper. The cuprous oxide is treated with phospho-molybdic acid. The clear, deep blue solution is compared with a standard in a colorimeter. The author has replaced the standard by a glass or glasses and describes how a glass standard is selected. The author introduces curves of correction for copper reduction by solutions of higher or lower concentration of sugar. He has carried out a series of tests as to the accuracy of the method. These tests show that the method gives results of considerable accuracy when more than 200 milligrammes of blood are used for each test.

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE NEW SOUTH WALES BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held on April 13, 1923, at the B.M.A. Building, 30 to 34, Elizabeth Street, Sydney, DR. C. H. E. LAWES, the President, in the chair.

Intelligence Tests.

DR. GILBERT E. PHILLIPS read a paper entitled "The Measurement of the Intelligence of School Children" (see page 599).

PROFESSOR A. E. MILLS thanked Dr. Phillips for his able and interesting discourse. Before proceeding with a few comments he asked Dr. Phillips if he would give them an outline of some of the modified Binet tests.

DR. PHILLIPS said that the modified tests for the mental age of above twelve years would fall into one of the following classes. The first was to ascertain whether the child could see the point in an absurd statement. An example of this would be: "Jack, John and I are all my brothers." The second group involved the appreciation of similarity or opposite. In the third group he employed straight-out reasoning. The facts were supplied and the child was required to apply the reasoning. In the fourth group the child was asked to explain the difference between chosen abstract terms. As an example he cited the two terms: generosity and charity. The fifth test comprised a mental inversion of the clock face. The child was asked to tell the time if the clock showed twenty minutes past seven and if the minute hand became the hour hand and the hour hand became the minute hand. Lastly, there was a test in which the child was given an incomplete sentence and was required to complete it.

PROFESSOR MILLS thanked Dr. Phillips for the information. Referring to the interpretation of the curves of the growth of intelligence, he said that he agreed with Dr. Phillips in disapproving of the two curves which indicated a sudden completion of intelligence at the age of sixteen and a more gradual rise to the highest point at the age of sixteen years. He felt sure that his own intelligence had not stopped in its development when he was sixteen. He suggested that after all experience was a test. He quoted a passage from the writings of Oliver Wendel Holmes in which he has likened boys to pears. Some ripened early and rotted early. Others hung on the trees for a long time and developed to a high degree of perfection. The boys who did well, obviously passed through a prolonged period of intellectual development. Turning to the contention of Dr. Phillips that they were backing the wrong horse when they endeavoured to educate those who were incapable of being educated, he qualified his agreement. It was, no doubt, wasteful and useless to try to do the impossible. But they had to do something for these unfortunate individuals. He thought that it was highly desirable to have adequate tests to insure that all children were in the classes for their special mental ages. He was very sympathetic and wished Dr. Phillips success in this endeavour. It was, however, impossible for the medical profession to help in a reform of this kind that involed the voting of large sums of money by Parliament. Professor Mills thought that it was most unfortunate that there was such a great disparity in the intelligence of different pupils in the same classes at school as Dr. Phillips had mentioned. His experience as a teacher at the University of Sydney lent support to what Dr. Phillips had said concerning this inequality of intelligence. He had recently spent much time in examining candidates for the final degree in medicine. This examination was not a mere memory test. The examiners endeavoured to get at the level of intelligence of the individual candidate. They paid more attention to understanding than to knowledge. For example, he might show a candidate a specimen of a heart. He would ask him to visualize the clinical condition of the patient from whom that heart had come.

Dr. Phillips had laid stress on the doctrine that the best were worth any amount of money that might be spent on them. It was interesting in this connexion to have regard to the statistics of the American Army, to which Dr. Phillips had referred. He did not know whether the intelligence tests that had been applied, were all that the Americans had claimed them to be. But taking them at their face value it was extraordinary how few individuals were above the average. Approximately 4½% were classed as of very superior intelligence, 9% as of superior intelligence, 11% as of above average intelligence and the rest, 75½%, as of average intelligence or below the average. And yet the Americans prided themselves on their greatness. It was surprising how small was the upper strata on which they were asked to spend all they could. It would seem as if the average man could not stand the strain of the present day civilization. The result would be a revolt of those of lower intelligence against the present system and this might lead to social revolution, an example of which they had in Russia.

DR. HARVEY SUTTON, O.B.E., joined in thanking Dr. Phillips for his interesting paper. He appreciated the value of the contribution all the more because he had himself dabbled in the subject. He desired to call attention to the fact that the American people were a heterogeneous community, a mixture of almost every race under the sun. It was possible that the mean intellectual level might not be high. On the other hand, Australia was extraordinarily homogeneous. He was greatly interested in Dr. Phillip's remarks concerning the super-normal individual. Intelligences tests would appear to have been applied from the earliest times. In the Old Testament Gideon had applied a test of this kind and he had succeeded in getting about 1% of the population. He was satisfied that the super-normal child was very exceptional. He held that the lower end of the curve was more important that the upper. Firstly, the doctors could join hands with the psychologists in this matter. Secondly, the subnormal child was more numerous. In a school population of ten thousand children in Sydney 1½% were not fit for education in the ordinary school and were only fit for education in a special school. Probably not less than one thousand children in Sydney fell under this heading. Special schools were needed for the training of the subnormal children. Further, it was the universal experience that it was easier to destroy and to be a nuisance than to create and to be useful. The social nuisances were very largely retarded children. Of the children brought up for delinquencies to the Children's Shelter 23% were very retarded and 12% were sub-normal to the extent that they had to be dealt with in special schools, *id est*, at least eight times the number in the average school population. They were practically not spending any money on the training of these children. They had no special day schools for mentally defective children. In England there was provision in such schools for sixteen thousand children. In New South Wales there would have to be schools for one thousand of these children, if they were doing as much in that State as the education authority was doing in England. It was a most significant fact that in his report on retrenchments, Geddes had stated that he could not recommend any reduction of the money voted for this purpose. In connexion with the examination of children at the Truant School mentioned by Dr. Phillips they had found that it was frequent for parental failure to be an important factor which emphasized the need for an all-round investigation of the individual case.

Dr. Sutton was satisfied that Dr. Phillips had adopted the most scientific attitude in regard to the growth of intelligence that had yet been put forward. He would wish to see comparative physical and mental tests set up side by side. The chronological age was not always parallel with the physical development. Attention should be paid to the time of the eruption of the teeth and skiagrams taken to determine the stage of ossification of the wrist bones as a test for industrial employment by Rotch. He would like to see an attempt made to range the mental alongside the physical age. Dr. Phillips's suggestion that every child should be tested at ten years of age was greatly to be desired. This was the best time for transferring those children that could not be taught at ordinary schools, to special schools. He hoped that a revolution of that character would come within the near future.

He would be much interested if intelligence tests could be applied to students at the University. He held that Dr. Phillips was wise in avoiding the definition of intelligence as he had said that they still awaited "an intelligent definition of intelligence." In conclusion, Dr. Sutton expressed the opinion that this work at present being carried out in Australia deserved their best thanks.

DR. T. H. FIASCHI, D.S.O., V.D., asked Dr. Phillips whether the children subjected to the intelligence tests had previously been tested for their physical health. A child might fail in these tests because of some physical impairment or loss of health. A boy had once been brought to him because he had been a failure at school. He had been regarded as mentally defective. Examination had revealed a high degree of hypermetropia. After this visual defect had been remedied, the boy had taken his place at school and had competed successfully with his comrades. He was convinced that some teachers endeavoured to prevent a child of ten years with a mental development of a child of thirteen or fourteen years from progressing as fast as he should and thus discouraged him. He disapproved of this. He wished to know whether Dr. Phillips advised that the children of super-normal intelligence should be kept waiting for their less favoured companions.

DR. RALPH A. NOBLE thanked Dr. Phillips for his paper which was of interest to them all. In devising the tests the author must of necessity employ tests requiring special intelligence in order to arrive at the general intelligence of the person tested. He maintained that they actually got a measure of special intelligence. He pointed out that intelligence tests were playing an increasing part in social and industrial life in America. In some instances intelligence tests were being applied to candidates for such a position as that of manager to large industrial firms. The value of these tests had been demonstrated in the statistics of the American Army. The experience gained in Australia during the war was important. Many had been sent away with a very low intelligence level and these figured largely in the residue of the uncured psychoneurotic pensioners.

It was usually left to the psychologist to make a report on the mental age and intelligence quotient. The psychologist had not received the training necessary to ascertain the person's capacity. The physical condition had to be gauged, the home conditions had to be taken into account and many other factors had to be studied. Adaptability depended on physical as well as mental factors. This fact held particularly in connexion with moral imbecility. The intelligence tests did not help them much with these individuals. It was somewhat surprising that among the prisoners at Sing-Sing 50% had been found to have a mental age of thirteen years. This happened to be approximately the same figure as that for the first draft for the American Army. Dr. Noble said that they could not use the intelligence tests as much as the psychologists would have them used. Moreover, all these tests would have to be coordinated to and employed in conjunction with physical tests. He was satisfied that it was necessary to spend much money on the lower end of the intelligence curve described by Dr. Phillips and that if nothing were done for the retarded children in Australia, Bolshevism would spread. These children could not use their brains, but if they were trained to use their hands and allowed to do so, they would give less trouble. He was satisfied that Australia was much behind in dealing with this problem. He admitted that the brilliant student was also damaged by the presence in the same class of backward children. Educationalists should group the children in the manner suggested by Dr. Phillips.

DR. F. BROWN CRAIG asked Dr. Phillips whether experience in the field and elsewhere had supported the findings of the intelligence tests in the soldiers of the American Army. He was especially interested to learn whether the sub-normal men had proved to be efficient or inefficient at a later date.

DR. C. H. E. LAWES added his tribute to Dr. Phillips. His lecture had been a very important one and he wished to thank him for coming to them for the purpose of discussing a highly interesting problem. There were two matters to which he would refer before asking Dr. Phillips to reply to the various speakers. The first was the new point of view that they had been backing the wrong horse in paying too much attention to the retarded child. He, the speaker, was surprised at this view. The brilliant boy would get to the top under all circumstances in spite of difficulties. In his opinion it was the backward child that needed help. The second point was the assumption that the intelligence quotient did not increase beyond the sixteenth year. His own experience had not borne this out. He was inclined to agree with Professor Mills that intelligence grew at all events until the age of twenty or twenty-one.

In his reply, DR. PHILLIPS said that Dr. Harvey Sutton appeared to have misunderstood his contention. He did not wish to suggest that the importance of the sub-normal child should be under-estimated as a social problem. On the contrary, it was a very vital question. But he maintained that the super-normal child would return a much larger dividend for the time and effort expended. It was a good investment to spend money on his education, for it was his work that would be the nation's assets at a later date. It was right and proper to train the sub-normal child to use his hands, if it were found that he could not use his brain. He instanced the case of one school where the head teacher had allowed a brilliant child to pass in the course of one year right up to the sixth standard. It should be possible for any child to progress at the rate of two standards a year, if the rate of development of his intelligence justified it. At one school 30% of the children moved at this accelerated pace. If this method of promotion were universal, it would effect a saving of hundreds of thousands a year in the Commonwealth.

He agreed that physical tests should be done at the same time as the intelligence tests were being applied. Unfortunately no physical tests had been carried out in the case of the children they had examined. Their studies had not been completed. They were endeavouring to fix the average or standard level at the various ages in large numbers of children. When they came to study individuals, it would be essential to seek the cooperation of medical practitioners in order to correlate the physical and the mental standards.

Dr. Phillips admitted that it was very rare for a brilliant boy to be impeded in his progress if permitted to go his own pace. Indeed, it was surprising that these boys almost always came to the top, in spite of the obstacles. The schooling they receive must be a handicap. Turning to one point raised by Dr. Noble he stated that every intelligence test was at the same time a test of special ability. The majority of the tests were chosen because the specific factor was low. He recognized that many mentally defective individuals had good motor ability. He instanced evidence of low intelligence with a highly developed artistic gift. No one would think of using a test of one specific factor alone. They used many. By employing several tests to which the intelligence factor was common, while the specific factors varied, the latter would cancel one another.

Replying to Dr. Brown Craig, Dr. Phillips stated that he had no knowledge of any evidence from the field corroborating the intelligence statistics of the soldiers of the American Army or correcting them, but in a preliminary investigation before soldiers went on active service reports by army officers on selected individuals showed a close correlation between the testing and the officer's estimation of efficiency. Persons of low intelligence had been used in the war in many instances for laborious tasks. Moreover, he pointed out that a person of low intelligence might make up for this defect by intense application, good memory and so on. People of high intelligence at times did badly. He thanked the members for their appreciative hearing.

A MEETING OF THE WESTERN AUSTRALIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the Perth Hospital, Perth, on April 18, 1923, the President, DR. D. M. MCWHAE, C.M.G., C.B.E., in the chair.

Acardiac Monster.

DR. A. K. COUCH showed a specimen, an acardiac monster. This was one of twins that had been born at King

Edward Maternity Hospital. The other twin weighed four kilograms (nine pounds) and was well developed. The irregular mass of the specimen proved to be a lower extremity. Some distance away and connected to it by a narrow band was a mass which apparently consisted of two cerebral lobes.

Pathological Specimens.

DR. F. A. HADLEY showed a specimen which consisted of the remains of a branchial cleft which had been running up towards the tonsil. Dr. Hadley had removed this without much difficulty from the neck of a young girl who had been suffering from the fistula since early childhood.

Dr. Hadley also showed a kidney with a stone in the pelvis which had caused a condition of hydronephrosis. Numerous small stones were present. The small stones had not been demonstrable by means of the X-rays. A point of interest in the case was the fact that the patient had complained of pain which had been confined to the back.

Renal Colic.

DR. H. B. GILL reported a case of renal colic. The point of interest lay in the fact that although the patient had complained of pain in the right side, the skiagram had shown the presence of a large stone in the left kidney.

Dr. Gill also reported the history of a patient, a woman, aged sixty-seven years, who had complained of pain in the right side. Dr. Gill had catheterized each ureter and had found that the right kidney was infected with the *Bacillus coli communis*. After the pelvis of the kidney of the affected side had been washed with a solution of colloidal silver on four occasions, the pain had disappeared.

Double Uterus.

DR. M. K. MOSS reported an instance of double uterus which was accompanied by a complete septum in the vagina.

Pneumonia.

Dr. Moss also read the history of a patient who had suffered from pneumonia and who had also had hæmorrhage from the bowel.

Dysentery.

DR. C. H. SHEARMAN read a paper entitled, "The Dysenteric Infections in Australia" (see page 604).

THE PRESIDENT thanked Dr. Shearman for his very valuable paper.

DR. W. P. SEED said that when practising on the gold fields he had seen many patients affected by dysentery. A considerable number of the patients had suffered from abscess of the liver.

DR. J. DALE, O.B.E., said that he would like to have information from practitioners who treated children suffering from summer diarrhœa.

DR. K. G. MCK. ABERDEEN related a personal experience of infection with amœbic dysentery. He stated the results of treating children with summer diarrhœa by means of serum were not always good. He though that bacteriological examinations should always be carried out in dealing with dysentery in patients at the Children's Hospital.

DR. M. K. MOSS said that there were not many instances in private practice of children who passed blood and mucus.

NOMINATIONS AND ELECTIONS.

THE undermentioned have been nominated for election as members of the New South Wales Branch of the British Medical Association:

HARPUR MALCOLM DENHOLME HUNTER, M.B., 1923 (Univ. Sydney), 115, Avenue Road, Mosman.

MCCLEMENS, DOROTHY MARY, M.B., Ch.M., 1921 (Univ. Sydney), Kulgoa Road, Bellevue Hill.

THE undermentioned have been elected members of the New South Wales Branch of the British Medical Association:

BARTON, NATHANIEL DUNBAR, M.B., Ch.M., 1923 (Univ. Sydney), Nanima, Wellington.

BÖHRSMANN, GUSTAV HALL, M.B., Mast. Surg., 1898 (Univ. Sydney), Enmore Road, Newtown.

CAMPBELL, REID INNES, M.B., Ch.M., 1923 (Univ. Sydney), "Post Office House," Woollahra.

COOKE, BADEN RANDELL, M.B., Mast. Surg., 1922 (Univ. Sydney), c.o. G. W. O'Neal, Esq., "Chamber of Commerce Building," Grosvenor Street, Sydney.

COOPER, ARTHUR GEORGE STENING, M.B., 1923 (Univ. Sydney), "Norella," Beecroft Road, Cheltenham.

CUTHBERT, NOËL MILLAR, M.B., Ch.M., 1923 (Univ. Sydney), Government Hospital, Kalgoorlie, Western Australia.

KEIRAN, JOHN BERNARD, M.B., B.S., 1922 (Univ. Melbourne), 362, New South Head Road, Rose Bay.

KLEIN, KEITH, M.B., Mast. Surg., 1923 (Univ. Sydney), Lithgow Street, Campbelltown.

LEVY, JACK, M.B., Ch.M., 1923 (Univ. Sydney), 249, King Street, Newtown.

LUDOWICI, RALPH HAROLD, M.B., Ch.M., 1922 (Univ. Sydney), Newcastle Hospital, Newcastle.

MARSHALL, GEOFFREY EDWIN LAMPORT, M.B., Ch.M., 1922 (Univ. Sydney), Campbell Street West, Toowoomba, Queensland.

MILES, ERIC HILTON, M.B., Ch.M., 1923 (Univ. Sydney), Angledool.

SUSMAN, MAURICE PHILIP, M.B., Mast. Surg., 1921 (Univ. Sydney), c.o. Commonwealth Bank of Australia, New Broad Street, London.

KENNEDY, ARTHUR JAMES, M.B., Mast. Surg., 1923 (Univ. Sydney), "Carnlough," Shaftesbury Road, Eastwood.

LOCKE, KEITH MORGAN, M.B., Ch.M., 1922 (Univ. Sydney), 69, Boyce Street, Glebe Point.

MAGNUS, ALEXANDER NOËL, M.B., 1923 (Univ. Sydney), c.o. Dr. E. R. Magnus, 175, Macquarie Street, Sydney.

STOBO, ALEXANDER JARVIE HOOD, M.B., 1923 (Univ. Sydney), c.o. F. E. Williams, Esq., Shirley Road, Wollstonecraft.

THE undermentioned has been elected a member of the Queensland Branch of the British Medical Association:

PORTER, EDWARD HARVEY, M.B., CH.M., 1921 (Univ. Sydney), Brisbane Hospital, Brisbane.

THE undermentioned have been elected members of the Victorian Branch of the British Medical Association:

BARRETT, HORACE ROWLAND GUEST, M.B., B.S., 1923 (Univ. Melbourne), Korumburra.

BENNETT, GEORGE FREDERICK, M.B., B.S., 1923 (Univ. Melbourne), Melbourne Hospital.

BOILEAU, GILBERT GEORGE BENSON, M.B., B.S., 1923 (Univ. Melbourne), "St. Croix," Stanhope Street, Malvern.

BOYT, MAVIS AMELIA ELEANOR, M.B., B.S., 1920 (Univ. Melbourne), Tarnagulla.

CARRINGTON, WILLIAM LANGLEY, M.B., B.S., 1923 (Univ. Melbourne), Melbourne Hospital.

DALY, KATHLEEN BESSIE, M.B., B.S., 1923 (Univ. Melbourne), Melbourne Hospital.

DAVIS, HARRY LYALL ELDERTON, M.B. B.S., 1922 (Univ. Melbourne), National Bank, Richmond.

FITZPATRICK, DAVID IMRIE, M.B., B.S., 1923 (Univ. Melbourne), Melbourne Hospital.

GUTHRIDGE, GEORGE HAROLD, M.B., B.S., 1923 (Univ. Melbourne), 4, Dendy Street, Brighton.

HALLOWS, BRUCE RUDOLPH, M.B., B.S., 1923 (Univ. Melbourne), 69, Claremont Avenue, Malvern.

HENSLEY, ANNIE DOREEN, M.B., B.S., 1923 (Univ. Melbourne), Melbourne Hospital.
HOLMAN, WILLIAM PROUT, M.B., B.S., 1923 (Univ. Melbourne), Melbourne Hospital.
JONES, EDWARD CHARLES BELL, M.B., B.S., 1923 (Univ. Melbourne), 291, New Street, North Brighton.
MAY, REGINALD FRANK, M.B., B.S., 1923 (Univ. Melbourne), Infectious Diseases Hospital, Fairfield.
NEVILLE, DAVID WILLIAM, M.B., B.S., 1923 (Univ. Melbourne), Melbourne Hospital.
PATRICK, MATTHEW CHALMERS, M.B., B.S., 1923 (Univ. Melbourne), 5, Margaret Street, Canterbury.
ROSS, KEITH CHISHOLM, M.B., B.S., 1923 (Univ. Melbourne), Melbourne Hospital.
SHARLAND, JAMES LEONARD WOODROFFE, M.B., B.S., 1923 (Univ. Melbourne), Melbourne Hospital.
TIGHE, LEO MICHAEL, M.B., B.S., 1922 (Univ. Melbourne), 28, Chaucer Street, St. Kilda.
TOWNSEND, ALAN ROBERT, M.B., B.S., 1923 (Univ. Melbourne), 62, Mont Albert Road, Mont Albert.

NOTICES.

THE COUNCIL OF THE VICTORIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION has arranged the following provisional programme of the Branch meetings. The Scientific Committee reserves to itself the right to modify the arrangement, but it is hoped that no changes will be necessary.

June 6, 1923.

CLINICAL MEETING at the Melbourne Hospital.

July 4, 1923.

At the Walter and Eliza Hall Institute of Research in Pathology and Medicine, Melbourne Hospital, at 8.15 p.m.

MR. W. KENT HUGHES: "Small Defects that Cause Serious Foot Disability and Their Treatment: Corns, Bunions, *Hallux Valgus*, Hammer-Toe, Weak Ankles, Flat Foot, including Metatarsalgia."

August 1, 1923.

CLINICAL MEETING at the Alfred Hospital.

Congress Notes.

AUSTRALASIAN MEDICAL CONGRESS (BRITISH MEDICAL ASSOCIATION).

THE EXECUTIVE COMMITTEE of the first session of the Australasian Medical Congress (British Medical Association) has resolved that papers contributed to any section by members who will be unable to attend the session of Congress, may be read with the sanction of the President of that section.

Programmes of the Sections.

The Secretaries of the Surgical Section are anxious to complete their programme in detail without further delay. All intending contributors are urged to communicate with them as soon as possible.

The programmes of the other sections are approaching completion. The work of the secretaries will be greatly facilitated if members intending to offer papers will intimate the fact to the secretary of the appropriate section without loss of time.

Congress Dinner.

The Congress Dinner will be held on November 15, 1923, as previously announced. The caterer has been selected and many details have been completed. Following the practice adopted at the Annual Meetings of the British Medical Association, as determined by the Federal Committee, the Executive Committee has arranged that the charge for the dinner will be one guinea exclusive of wines, spirits, cigars and cigarettes. Members intending to be present at the dinner are requested to forward this amount not to the General Secretary or Treasurer, but to Dr. B. T. Zwar, Honorary Secretary of the Catering Committee, 54, Collins Street, Melborune.

Accommodation.

We would again urge those who proposed to attend the First Session of Congress and who have not yet secured accommodation, to do so without loss of time. There are very few rooms available at the chief hotels.

House.	Address.	Persons to Accommodate.	Rooms.		Tariff.	
			Double	Single.	Per Day.	Per Wk.
Scott's	Collins Street West, Melbourne	26	6	14	23s.	
Windsor (formerly Grand)	Spring Street, Melbourne	200	—	—	20s.	
Carlyon's	Spencer Street, Melbourne	30	—	—	Single Room, 5s.; Double Rooms, 10s.; Meals as taken	
Union Club	Collins Street West, Melbourne	6	—	—	20s.	
New Treasury	Spring Street, Melbourne	20	—	—	16s.	£4 4s.
Port Phillip	Flinders Street, Melbourne	30	—	—	15s.	
Victoria Coffee Palace	Collins Street East, Melbourne	200	—	—	Single Rooms, 3s. 6d. and 4s. 6d.; Double Rooms, 6s., and 10s.; Meals as taken	
Federal Palace	Collins Street West, Melbourne	200	—	—	11s. 6d. to 20s.	
Cathedral Hotel	Swanston Street, Melbourne	12	—	—	10s. 6d.	£3 3s.
Esplanade (Carlyon's)	Esplanade, St. Kilda	6	—	—	20s.	
George	Fitzroy Street, St. Kilda	40	20	—	15s.	
Ritz	Fitzroy Street, St. Kilda	30	—	—	20s.	
Prince of Wales	Fitzroy Street, St. Kilda	30	15	—	13s. 6d.	
Beaconsfield	Beaconsfield Parade, St. Kilda	25	—	—	15s.	
Inverleigh	12, Acland Street, St. Kilda	11	4	3		
Victoria Hotel	South Melbourne	30	—	—		£5 5s. to £6 6s.
Bridge Hotel	Mordialloc (15 miles by electric train)	14	4	6	12s.	£3 3s.
Hampton Hotel	Hampton (10 miles by electric train)	12	—	—	15s.	£3 3s.
Royal Terminus (Kemp)	Brighton Beach (9 miles)	10–12	—	—		£5 5s.
Beaumaris Hotel	Beaumaris (11 miles by motor to rail in November)	20	—	—	15s.	£4 4s.
Mentone Hotel	Mentone (13 miles by electric train)	20–50	—	—	15s.	£4 4s.

Nomination of a Member.

In accordance with Regulation 4 (b), Dr. James Mitchell, of 88, Tooronga Road, East Malvern, Victoria, not being a member of the British Medical Association, has been nominated for membership of Congress by Mr. G. A. Syme, President of the Congress, and seconded by Dr. Konrad Hiller. The Council of the Victorian Branch of the British Medical Association at a meeting held on May 19, 1923, offered no objection to the admission of Dr. Mitchell as a member of Congress. In accordance with the regulation the nomination is now published in THE MEDICAL JOURNAL OF AUSTRALIA.

Ladies' Committee.

A Ladies' Committee has been formed from the Ladies' Medical Red Cross Guild to advise and assist the Executive Committee of Congress in the entertainment of the wives and lady friends and relatives of visiting members. The President of this committee is Lady Allen, the Vice-Presidents are Mrs. G. A. Syme and Mrs. David Grant, the Honorary Secretary is Mrs. R. R. Stawell and the members are Mrs. A. V. M. Anderson, Lady Barrett, Mrs. Clendinnen (senior), Mrs. Rupert Downes, Lady Maudsley, Mrs. Murray Morton, Mrs. H. D. Stephens and Mrs. Zwar.

This committee requests all medical practitioners who propose to become members of Congress, to intimate on the forms of application to be sent to the Local Secretaries whether they will be accompanied by ladies or not in order that satisfactory arrangements may be made. These forms should be sent in at an early date.

Returned Medical Officers.

Arrangements for the dinner of the Returned Medical Officers are in the hands of Dr. Victor Hurley, C.M.G., 12, Collins Street, Melbourne. The dinner will be held on November 13, 1923.

Medico-Legal.

DR. G. S. THOMPSON v. AUSTRALASIAN MEDICAL PUBLISHING COMPANY, LIMITED.

A writ has been issued by Dr. G. S. Thompson against the Australasian Medical Publishing Company, Limited, and others for £5,000 damages in respect of an alleged libel. On May 25, 1923, the defendants in the suit applied to Mr. Justice Ralston in chambers for leave to examine certain witnesses on commission in New Zealand. The application was granted on condition that the commission be returned before September 1, 1923, and that the action be set down for trial on the first day of the September sittings.

Correspondence.

HYPNOTIC SUGGESTION.

SIR: The existence of Hicksonism, Christian science, mental healing, Coué-ism and others of that ilk, should force the medical profession to pay attention to a realm of the healing art which owing to their neglect, has been exploited with considerable success by lay practitioners. There are innumerable cases where we are asked to minister to a mind just this side of the border line, or to some nervous condition which refuses to respond to the stock remedies. These are the cases where the patient at last loses faith in his medical adviser and becomes the "miraculous cure" after "the doctors had given him up." The pity of it is that the medical attendant could deal with the great majority of these cases much more satisfactorily than the ignorant, unscientific lay "healer" can, if only he would realize the possibilities of suggestion and especially of hypnotic suggestion.

Many are still under the delusion that only certain persons are gifted with the power to induce the hypnotic state. This is not so. Anyone can do it, though experience is needed to get the best results. All medical students should therefore be shown the methods by which the state can be brought about and instructed as to the cases in which it is probable that successful results could be obtained.

This, however, must be remembered that every case is a law to itself. One case might almost pass as a miracle, another similar one does not respond in the slightest degree. It is more than thirty years ago since I saw Liébault working wonders at Nancy, and Charcot, Voison and Luys getting miraculous cures occasionally at Salpetrière and La Charité in Paris. In spite of these results, there has ever lurked in the minds of the profession generally a suspicion that hypnotism was near akin to humbug.

And of late years the psycho-analysts have come forward to claim the whole field of nervous disorders for themselves and to dismiss hypnotic suggestion as a futile tinkering with symptoms and effects. I find myself too old and indolent to embark on this new therapy which seemingly demands a day of ninety-six hours and inexhaustible patience to carry out effectively, and am content with the results got from the method which has given satisfaction in so many cases.

Looking back over thirty-three years' experience, I would say that the two conditions I have had most success with are chronic insomnia and alcoholism. I have had good results even in the case of female inebriates. As for cases of chronic rheumatism, old hemiplegias, lumbago and other kinds of pain, the same temporary improvement can be obtained in some of them as is got by the excitement of the "spiritual healing" campaign.

I agree with Dr. J. V. McAree that many so-called psychoses, fixed ideas, obsessions, *et cetera*, can often be removed in a marvellous manner. In fact, hypnotic suggestion can be kept as a last card to play if other treatments fail and its possibilities should not be overlooked.

If it does no good, it at least will do no harm.

Yours, etc.,

RICHARD ARTHUR.

211, Macquarie Street, Sydney.
May 21, 1923.

THE WASSERMANN REACTION.

SIR: The "case" recently reported (THE MEDICAL JOURNAL OF AUSTRALIA, May 12, 1923, page 529) by Dr. E. H. Molesworth is of more than passing interest to many of your readers. When the serum of a patient said to be suffering from recently generalized (secondary) syphilis is reported to give a persistently negative Wassermann reaction (or, to appease the purists, fails to give the Wassermann reaction), is one to sit back and murmur resignedly, "this is the exception which proves the rule?" Certainly not, for although I have the greatest respect for Dr. Molesworth's appreciation of the protean manifestations of syphilis, I have an even greater appreciation of the ability of the *Spironema pallidum* to produce the so-called "Wassermann substance" in the invasive stage. Unfortunately I have good reason to believe that the improved methods for the detection of the Wassermann substance have not been generally appreciated in spite of persistent publication.

I hold that either this patient was not suffering from secondary syphilis or the Wassermann reaction was missed through some error. An error may be accidental; for example, it is possible that the clinician or the bacteriologist may wrongly label the specimen of blood or serum, just as it is possible, though extremely unlikely, for a surgeon to remove the healthy member of a paired organ. It cannot be imagined, however, that such an error would be repeated at the next testing. On the other hand, and this is the more likely, the error may be due to an inherent fault in the technique or method adopted. It is my considered opinion that a negative report on a serum examined by the old warm method or with insufficiently sensitive extracts (so called "antigens") is not a reliable report; it is not the best that can be done. It is correct in the large majority of cases, but as Hamilton Fairley and Cyril Shearman in Australia have shown and Mona Ross and myself have abundantly confirmed, quite a number of patients whose lesion the clinician suspects to be syphilitic, or who have been under treatment for

the disease, quite a number of these give a definite reaction only by the slow cold method. One sometimes obtains a weak reaction or a hampering of hæmolysis by the rapid warm method in these cases, though the reading by the cold method is quite a clear cut strong reaction. Hamilton Fairley states (THE MEDICAL JOURNAL OF AUSTRALIA, December 24, 1921, page 591), "I have never examined the serum of a secondary syphilitic which failed to yield a reaction to the ice-box method. In this series (88 cases of secondary syphilis), the percentage of positive results with warm and cold fixation were 97.7% and 100% respectively. The practical significance of such findings is considerable, for the clinician is able to determine whether any rash which resembles that seen in secondary *lues*, is syphilitic or not." Cyril Shearman (THE MEDICAL JOURNAL OF AUSTRALIA, June 17, 1922, page 659) examined thirty-two patients with the secondary lesions and found the reaction in all by the cold method, and in thirty of thirty-two by the warm method. I do not remember seeing a patient with secondary syphilis fail to give a reaction. Both Fairley and Shearman failed to obtain the reaction by the warm method in only two out of eighty-eight and two out of thirty-two sera respectively. It is not the reaction which fails, but the method.

Further, let us examine Dr. Molesworth's explanation of his results. It will be admitted perhaps by clinicians that the visible lesions of recently acquired syphilis very rarely fail to disappear under active treatment by the best arsenical and mercurial preparations. It will also be admitted that the serum of a patient with secondary syphilis rarely fails to give a Wassermann reaction in any laboratory, even as I have shown, when the older methods are used. The coincidence of these two conditions in one patient would be excessively rare unless they had some correlation, and Dr. Molesworth has, perhaps by a slip of the pen, run on to this correlation to explain his findings, for in his penultimate paragraph, we read: "In my opinion the persistent absence of a Wassermann reaction is probably associated with a low degree of personal resistance, which in turn seems to be associated with failure to produce those substances which in the serum of an infected person produce a Wassermann reaction." If such a correlation existed, his case would not be so weak, for in acute bacillary infections, such as enteric, one sometimes does find a considerable delay in the appearance of agglutinin and generally in very intoxicated patients. But the Wassermann substance which one attempts to estimate in the Wassermann reaction, is not simply the immune body formed by the *Spironema pallidum*. Its exact nature is unknown, though it has been described as the lipoidophil or lipotropic substance which results from the biological activities of the *Spironema pallidum*, and on the other hand, the reaction has been attributed to a physical change in the plasma rather than to the existence of a definite substance. It has been found not to run parallel with the immune body for whose demonstration cultures of *Spironema pallidum* are used, and not the extracts of normal organs as in the Wassermann reaction. The evidence that the Wassermann substance is peculiar to syphilis, yaws and certain types of leprosy is well nigh overwhelming and in my experience this substance is always present in secondary syphilis, but certain methods still used in at least one institution in Sydney will occasionally fail to find it and if these methods occasionally fail in that stage when the substance is present in large amounts, they will fail and do fail more often in those stages when much delicacy of technique is required to elicit a definite reaction. It is quite probable that the Wassermann test will eventually be replaced by some simpler test but it will have fulfilled a very useful purpose for many years and it is remarkable that a test not based on specific immune body in the ordinary sense should have withstood so much criticism. Nor is it generally appreciated even by laboratory workers that its sensitiveness has been enhanced recently by modifications in technique, principally by lowering the temperature and increasing the time in the first stage.

Yours, etc.,
A. H. TEBBUTT.

185, Macquarie Street, Sydney.
May 19, 1923.

THE USE AND MISUSE OF THE TOOTHBRUSH.

SIR: It has been very gratifying to me to note the interest my letter *re* "The Use and Misuse of the Toothbrush" has given rise to. The main object of my letter was to point out the danger of using a dirty toothbrush, which I venture to assert the average are. Then also to suggest an easy and practicable means of keeping a toothbrush in a fairly clean state. The saturated solution of thymol in water (1-1,500) will kill *Bacillus coli* in two and a half minutes and this can be considered a very effective disinfectant. The experiments conducted by *The Lancet* method show that thymol in a saturated solution is very effective. Thus, thymol has a high germicidal power and is not affected by heat, has no corrosive action on metals and is miscible with water. True, other disinfectants might be used, but a lump of thymol lasts such a long time that renewal is only necessary about twice a year. With a clean toothbrush very little harm can result if the gums are accidentally lacerated. As regards the treatment of the gums as mentioned by R. Morse Withycombe, I would like to recommend the use of the following which will be found exceedingly useful in clearing up gingivitis.

To be used on a piece of cloth after cleaning the teeth with a clean tooth brush.

℞ Thymol	.. ..	15.00 gramme (grs. ii)
Spiritus vini rectificati	..	15,00 c.cm. (ʒ ss)

Dissolve and add previously dissolved or rubbed in mortar:

Potassi chloridi	.. ..	0,36 gramme (grs. vi)
Liquoris hydrogenii peroxidi		90.00 c.cm. .. .. (ʒ iii)

Then add:

Aquam ad	.. .. ..	240.00 c.cm. (ʒ viii)

To be rubbed on the gums with a cloth after cleaning the teeth two or three times a day for a week or two.

It is not necessary to continually use this. Occasional use is all that is required. The above lotion is best made as indicated, but the constituents will dissolve eventually if all mixed together, but then some time elapses before solution occurs.

In my practice I always advise the use of the above lotion for about a week, and this clears practically all the gingivitis. Then if the teeth require the attention of the dentist the gums are in first-class order which is an obvious advantage.

To reiterate, for the care of the gums and teeth:

(*i*) keep the toothbrush in thymol (saturated) solution,
(*ii*) use no tooth paste or powders,
(*iii*) rinse the mouth out thoroughly of all gross particles, using a tooth pick or dental floss silk if necessary,
(*iv*) brush the teeth inside and out, up and down with the toothbrush removed from the thymol solution. Avoid rubbing the gums as far as possible. Then
(*v*) rinse the mouth out if required,
(*vi*) clean the brush in running water for preference,
(*vii*) replace the brush in the thymol solution and allow it to stay there till again required for use.

The toothbrush should be not too stiff (a very soft one for preference). The thymol solution does not soften the attachment of the bristles in the brush in any way; in fact, thymol has a tendency to harden glues and cements.

Yours, etc.,
A. J. J. TRIADO.

22, Collins Street, Melbourne.
May 9, 1923.

Obituary.

HERBERT LETHINGTON MAITLAND.

IT is with great regret that we have to announce the death of SIR HERBERT L. MAITLAND, of Sydney, which took place suddenly on May 23, 1923.

Books Received.

HÆMATOLOGY IN GENERAL PRACTICE, by A. Knyvett Gordon, M.B., B.C., B.A. (Cantab.); 1923. London: Baillière, Tindall and Cox; Crown 8vo.; pp. viii. + 100, with three plates. Price: 5s. net.

HISTORY OF THE GREAT WAR BASED ON OFFICIAL DOCUMENTS—MEDICAL SERVICES: DISEASES OF THE WAR, edited by Major-General Sir W. G. Macpherson, K.C.M.G., C.B., LL.D., Major-General Sir W. P. Herringham, K.C.M.G., C.B., Colonel T. R. Elliott, C.B.E., D.S.O. and Lieutenant-Colonel A. Balfour, C.B., C.M.G.; Volume II.; 1923. Edinburgh: His Majesty's Stationery Office; Demy 8vo., pp. viii. + 621, with twelve figures. Price, post free, 26s. net.

INSANITY AND THE CRIMINAL LAW, by William A. White, M.D.; 1923. New York: The Macmillan Company; Sydney: Angus and Robertson, Limited; Crown 8vo., pp. ix. + 281. Price: 12s. 6d. net.

POISONOUS PLANTS OF ALL COUNTRIES, by A. Bernhard-Smith, Second Edition; 1923. London: Baillière, Tindall and Cox; Crown 8vo.; pp. xii. + 112, with 185 figures in the text. Price: 6s. net.

THE ANTIQUITY OF DISEASE, by Roy L. Moodie; 1923. Chicago, Illinois: The University of Chicago Press; Crown 8vo.; pp. xvi. + 148, with 37 illustrations. Price: $1.50.

THE FORM AND FUNCTIONS OF THE CENTRAL NERVOUS SYSTEM, by Frederick Tilney, M.D., Ph.D. and Henry Alsop Riley, A.M., M.D.; Foreword by George S. Huntington, Sc.D., M.D., Columbia University; Second Edition; 1923. New York: Paul B. Hoeber; Crown 4to.; pp. xxvi. + 1019, with 591 figures, containing 763 illustrations of which 56 are coloured. Price: $12.00.

Medical Appointments.

DR. E. A. JOHNSON (B.M.A.) has been appointed Deputy Inspector-General of Hospitals in South Australia during the absence of Dr. B. H. Morris (B.M.A.).

* * * *

DR. N. M. CUTHBERT (B.M.A.) has been appointed Resident Medical Officer at the Government Hospital, Kalgoorlie, Western Australia.

* * * *

DR. JOHN KENNY (B.M.A.) has been appointed Chairman of the Court of Session, Resident Magistrate and Magistrate of the Local Court at Roebourne, and Chairman and Member of the Roebourne and Onslow Licensing Courts, Western Australia.

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DR. F. A. HADLEY (B.M.A.) has been appointed a member of the Nurses' Registration Board, Western Australia.

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DR. R. J. ORFORD (B.M.A.) and DR. C. E. PERCY (B.M.A.) have been appointed Government Medical Officers at Stroud and at Manildra, respectively, in New South Wales.

* * * *

DR. N. W. HANSARD (B.M.A.) has been appointed Deputy Licensing Magistrate of the Licensing Court for the Licensing District of Rylstone, New South Wales.

* * * *

DR. FREDERICK TOOTH (B.M.A.) has been appointed on probation, Medical Officer in the Medical Branch of the Department of Education of New South Wales.

Medical Appointments Vacant, etc.

FOR announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser," page xviii..

BUREAU OF MEDICAL INSPECTION, BROKEN HILL, NEW SOUTH WALES: Assistant Medical Officer (Male).

ROYAL HOSPITAL FOR WOMEN, PADDINGTON: Resident Medical Officer.

ROYAL NORTH SHORE HOSPITAL OF SYDNEY: Honorary Physician.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, 429, Strand, London, W.C..

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 30 - 34, Elizabeth Street, Sydney	Australian Natives' Association Ashfield and District Friendly Societies' Dispensary Balmain United Friendly Societies' Dispensary Friendly Society Lodges at Casino Leichhardt and Petersham Dispensary Manchester Unity Oddfellows' Medical Institute, Elizabeth Street, Sydney Marrickville United Friendly Societies' Dispensary North Sydney United Friendly Societies People's Prudential Benefit Society Phœnix Mutual Provident Society
VICTORIA: Honorary Secretary, Medical Society Hall, East Melbourne	All Institutes or Medical Dispensaries Australian Prudential Association Proprietary, Limited Manchester Unity Independent Order of Oddfellows Mutual National Provident Club National Provident Association
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane	Brisbane United Friendly Society Institute Stannary Hills Hospital
SOUTH AUSTRALIA: Honorary Secretary, 12, North Terrace, Adelaide	Contract Practice Appointments at Renmark Contract Practice Appointments in South Australia
WESTERN AUSTRALIA: Honorary Secretary, Saint George's Terrace, Perth	All Contract Practice Appointments in Western Australia
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington	Friendly Society Lodges, Wellington, New Zealand

Diary for the Month.

JUNE 6.—Victorian Branch, B.M.A.: Branch.
JUNE 8.—New South Wales Branch, B.M.A.: Clinical Meeting.
JUNE 8.—Queensland Branch, B.M.A.: Council.
JUNE 8.—South Australian Branch, B.M.A.: Council.
JUNE 12.—New South Wales Branch, B.M.A.: Ethics Committee.
JUNE 13.—Western Australian Branch, B.M.A.: Council.
JUNE 13.—Melbourne Pædiatric Society.
JUNE 14.—Victorian Branch, B.M.A.: Council.
JUNE 15.—Eastern District Medical Association, New South Wales.
JUNE 19.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
JUNE 20.—Western Australian Branch, B.M.A.: Branch.
JUNE 20.—South Sydney Medical Association, New South Wales.
JUNE 21.—Brisbane Hospital for Sick Children: Clinical Meeting.
JUNE 22.—Queensland Branch, B.M.A.: Council.
JUNE 26.—New South Wales Branch, B.M.A.: Medical Politics Committee; Organization and Science Committee.
JUNE 27.—Victorian Branch, B.M.A.: Council.
JUNE 28.—South Australian Branch, B.M.A.: Branch.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to "The Editor," THE MEDICAL JOURNAL OF AUSTRALIA, B.M.A. Building, 30-34, Elizabeth Street, Sydney. (Telephone: B. 4635.)

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